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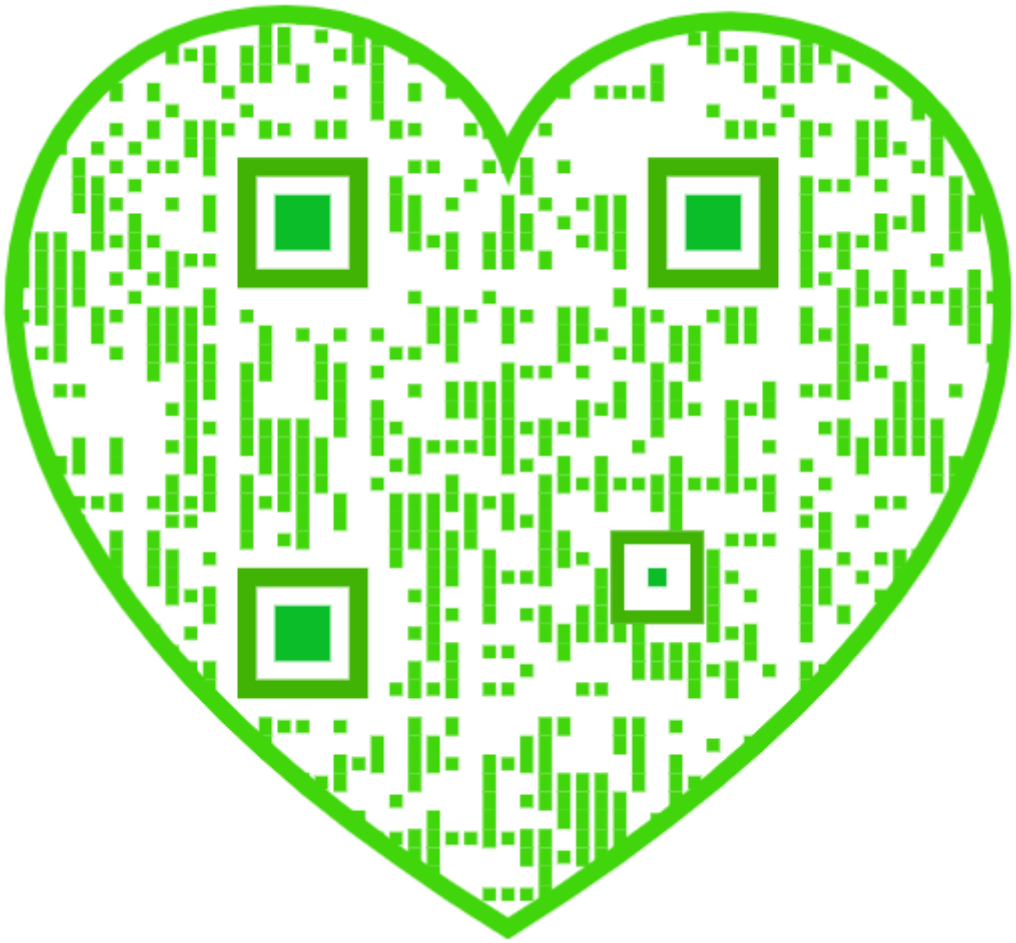
TEACHING APPRENTICES IN THE PRINTING TRADES

U.S. DEPARTMENT OF EDUCATION



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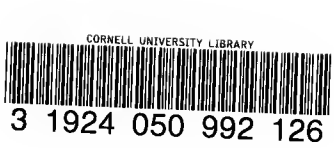
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TEACHING APPRENTICES IN THE PRINTING TRADES

A MANUAL FOR
INSTRUCTORS IN SCHOOLS OF PRINTING
AND FOR
FOREMEN HAVING SUPERVISION OF APPRENTICES
IN PRINTING PLANTS

1922

PUBLISHED BY
UNITED TYPOTHETAE OF AMERICA
DEPARTMENT OF EDUCATION
607 SOUTH DEARBORN STREET
CHICAGO

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UNITED TYPOTHETAE OF AMERICA
CHICAGO

Printed at U. T. A. School of Printing, Indianapolis

Instructor in Printing:

This book is written for you. It sets forth only a few of the fundamental principles of teaching, and should be regarded as merely an introduction to the study which every instructor should make of the literature of his profession. If these pages lead to further reading and to careful study and interpretations of your own experiences as an instructor, it will have accomplished its purpose.

L. S. HAWKINS
Director of Education
United Typothetae of America

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CHAPTER I

THE PRINTER AS AN INSTRUCTOR

The successful printing instructor is a master of two trades: *Printing* and *Teaching*. At present he is hard to find. An intelligent and progressive printer with a good education can, however, by study and experience, develop skill in teaching. The purpose of this manual is to explain to such a printer a few of the fundamental principles of teaching, and to suggest readings which will further extend his knowledge in this field.

Such self-study can not take the place of a systematic course of training for teaching. At the present time there is available in every state money to prepare experienced journeymen for teaching. Evening extension courses for this purpose are offered in many of the cities. If you desire such instruction and do not know whether it is available in your city, write to the State Board of Vocational Education located in the capital city of your state and make inquiry concerning this matter.

Printing and Teaching

These two trades have three factors in common: *aim, method,* and *results;* but the application of these factors naturally varies according to the nature of the trade.

The aim of the printing shop is to produce good *printing,* while the aim of the printing school is to produce skilled and intelligent *printers.* What the printer will *print* is determined by the customer's *copy,* but what the instructor will *teach* is determined by the needs of the *apprentice.* How a job will be printed is a matter left to the *printer* to decide, and how a lesson is to be taught is a problem for the *instructor* to solve. The results of the printing plant are measured

by the kind of *printing* it turns out, and of the school of printing by the kind of *printers* it produces.

Production and Instruction

Whether or not the right things have been done in the right way is tested by the extent to which the aim has been accomplished as shown by the results. The experienced printer usually brings to his instructing job the aims of the commercial plant. He frequently sacrifices the thorough and systematic development of his students to a desire for

The Difference Between the Printer and the Instructor

	As a Printer	*As an Instructor*
Aim	To produce good printing	To produce good printers
Material	Copy	Apprentices or Students
Method	Best trade practice	Best method of teaching the best trade practice
Results	Good printing	Good printers

commercial showing. This is generally due to three things: (1) The lack of a series of graded lessons based upon an analysis of the trade and arranged with due regard to their learning difficulty. (2) The instructor's lack of knowledge of teaching methods. (3) An attempt to make the school self-supporting by turning out a commercial product. What happens in many cases is that while the apprentices may actually set the type or feed the press on an advanced job,

the instructor makes the layout or makes ready the forms, adjusts the press, etc., *i.e.*, does the skilled headwork. This would be all right were it not for the fact that the work is then called students' work, and the students themselves are made to believe that they did the important part. There is no doubt about the necessity of having the apprentices learn standard commercial methods and work on live jobs, but there should be no mislabeling of the work (especially in the minds of the apprentices); students should not be put on work in advance of their instruction, nor should their progress be retarded by putting them on routine work to get out production (*i.e.*, in the school shop).*

If a school is to turn out commercial work, one of two conditions should govern: (1) Paid labor should take care of such phases of the job as do not fit into the instruction program at any time. It may be that the instructor himself will have to perform some parts of the job that are not within the ability of students, or not profitable for them to perform from the standpoint of instruction. There is no objection to this occasionally, but it should not be passed out as students' work, nor should it be so extensive as to interfere with the instructor's real work, *i.e.*, *teaching*. (2) The job should wait on the progress of instruction, and the number, kind, and size of the jobs accepted should be determined by the instructional demands. *In the school, instruction should never be sacrificed for production.* The aim of the school is to produce printers. Doing real work in printing is a necessary means to the end in view, but the production of printing should always be used as a *means* and not an *end*. As a printer, you are responsible for seeing that the best commercial printing standards maintain in the school shop; but as an instructor, you are responsible for seeing that your primary product is good printers.

*In the case of the part-time school for apprentices, the school teaches the how and why, while the employer provides an opportunity for the apprentice to work on production as far advanced as his instruction will permit. It is only in the shop on productive work that he will get speed and facility of workmanship.

The following requisition blank shows how the public school system of Buffalo handles the question of productive work in the vocational schools.

Read regulations below before filling out blank.
To be filled out by person for whom work is to be done.

Requisition Blank for Work to be Done in Vocational Schools

No. ..... Date .....

Requested by .....Address .....

Requisition for: *(Check kind of work thus: X)*

	Carpentry		Printing
	Cabinet Work		Machine Shop Work
	Electrical Construction		Photography
	Pattern-Making		

In all requisitions, state fully for what purpose job is to be used, so as to convey to the teacher and pupils who are to do the work an intelligent notion of the general requirements to be filled.

Work required .....

Specifications: .....

For Woodwork: Kind of wood preferred .....Finish.....

For Printing work: Size of paper stock .....Color of stock .....

Proof wanted? .....Quantity .....

.....

Give below name of person who prepared plans or drawings or wrote copy for printing, so as to facilitate future consultations, if necessary.

Regulations Governing Work in Vocational Schools

The State Education Department recommends, and all Vocational authorities agree, that schoolshops should undertake and perform actual work and turn out a commercial product. The Buffalo Vocational Schools have the necessary equipment, machinery, etc., to do such work. During the past few years, thousands of dollars' worth of "commercial products" have been made, and the Schools stand ready to be of material service to the department in general.

Past experience, however, seems to warrant the following regulations for submitting work:

1. *Plenty of time must be allowed for the performance of jobs, so that they may be taken up in the shop as educational projects. Rush work has no place in the Schools. The "product" must always be secondary to the question of "training the boy." For some work, a much longer time is necessary. In no cas should work be expected in less than one month.*

2. Copy for printing must be carefully edited. Special attention must be paid to spelling, punctuation, style, and arrangement. Specifications and drawings for woodwork, etc., must be prepared in such a manner that pupils may easily read and understand them.

3. Delivery for all small jobs must be arranged by person for whom work is being done. Principals of Vocational Schools will send notifications when jobs are ready for delivery.

4. *The Schools reserve the right to reject requests for jobs that have little or no educational value; that are too large or too complicated for vocational boys, or that might "tie-up" shops and machinery unduly long.*

(To be filled out by Vocational Instructor)

Date Received .....Date Completed .....

School Cost .....Commercial Value .....

The Untrained Versus the Trained Teacher

The Untrained Teacher.	*The Trained Teacher.*
1. Has not learned trade of teaching. (May have practiced at it, but has not learned it.)	1. Has learned how to teach by one of these methods: (a) Pick up (trial and error). (b) Apprenticeship. (c) School training.
2. Tries to do all work himself.	2. Gets reaction and performance from students.
3. Is unable to take account of his stock of knowledge.	3. Has his subject carefully analyzed.
4. Is unable to classify his knowledge, *i. e.*, to arrange it in teaching order.	4. Has his lessons arranged according to learning difficulty of student.
5. Does not distinguish between teaching and giving information.	5. Comprehends the several phases of the teaching process.
6. Does not know how to plan so as to give the learner the right thing at the right time.	6. Provides for presentation of each thing, fact, or principle at the proper time.
7. Does not know how to keep students at work. Wastes their time.	7. Economizes and conserves the students' time.
8. Does not teach thoroughly.	8. Is thorough in whatever he presents.
9. Does not know how to arrange instructional surroundings.	9. Has equipment and material properly arranged.

Successful teaching depends upon careful analysis of each phase of the teaching job:

(a) Analysis of subject matter (what to teach).
(b) Analysis of students (whom to teach).
(c) Analysis of teaching facilities, equipment, etc. (with what to teach).
(d) Analysis of teaching methods (how to teach).
(e) Analysis of economic and social conditions in the community (functioning of teaching).

Questions

1. What are the qualifications of a good instructor in printing? *Allen, Chap. IV; *P. A. P., Parts I, and IV.

2. What common difficulties does the printer encounter when he tries to become an instructor? Allen, Chap. V, and Chap. XV.

3. What are you doing to improve yourself as an instructor?

   (a) Making a careful record of your classroom practice, both successes and failures, in order that you may do better with the next class?

   (b) Attending any night classes, Saturday courses, summer sessions, or other classes where you are getting instructor-training work?

   (c) Reading instructors' training books and magazines?

   (d) Attending meetings of vocational teachers?

4. What are you doing to improve yourself as a printer?

   (a) Reading the trade journals?

   (b) Visiting good printing plants?

   (c) Studying samples and exhibits of good typography?

   (d) Occasionally setting or running a job?

   (e) Attending meetings of printers and keeping in touch with printers' organizations?

---

*Allen, Charles R.—The Instructor, the Man, and the Job. Published by J. B. Lippincott & Co., Philadelphia.

*P. A. P.—Practical Apprenticeship for Printers. Published by United Typothetae of America, 608 South Dearborn Street, Chicago.

CHAPTER II

WHAT TO TEACH

A man may be a first-class printer and yet not be able to organize his knowledge even to the extent of listing all the things one must know and be able to do to be recognized as a competent workman in his particular branch of the trade. Even if such a list be provided him, he finds difficulty in arranging the items of it in the best instructional order. In training courses for trade teachers, much attention is given to this matter of analyzing the trade into its type jobs, then arranging these jobs in the order of learning difficulty in building up an instruction program.

The U. T. A. Standard Apprenticeship Lessons

In an effort to aid the practical printer who has not had the advantage of a teacher-training course but must assume the duties of instructing the apprentices, the Department of Education of the U. T. A. has made a tentative analysis of the printing trades. In this analysis the trade is divided into main divisions called groups, each group is divided into units, and each unit is broken up into lessons. (See Appendix A for Outline of Standard Apprenticeship Lessons.)

In order that you may understand the principles which have governed in making this analysis of the trade and the construction of the teaching material, the following explanations are given.

The Instruction Groups

In Figure 1 let A represent the apprentice and J the journeyman hand compositor. The line A-J represents the

amount of skill and knowledge which the apprentice must acquire to become a journeyman compositor. This is a long

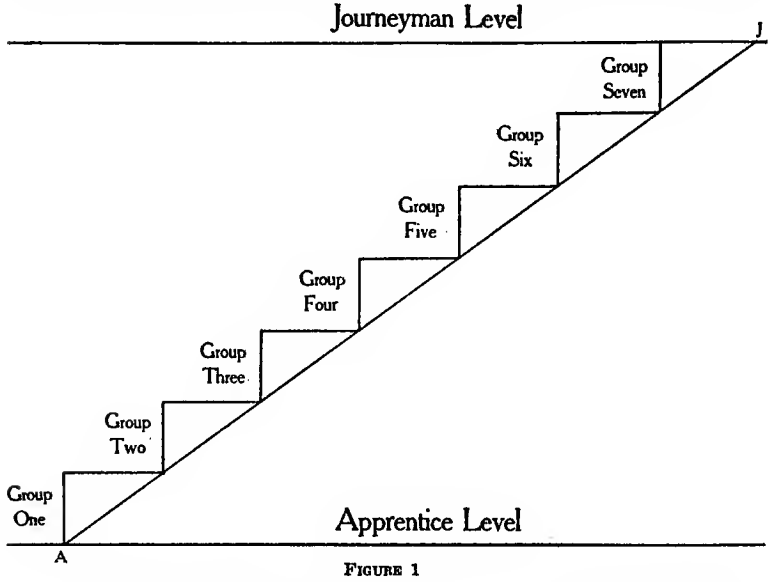

FIGURE 1

and difficult journey and no apprentice can make it in one step; so we construct a stairway, the steps of which for convenience may be called groups, named as follows:

Group One—Elements of Composition.
Group Two—Book Composition.
Group Three—Display Composition.
Group Four—Advertising Composition.
Group Five—Job Composition.
Group Six—Stone Work.
Group Seven—Platen Press.

This grouping is made on the basis of the kind of learning difficulties involved and, therefore, the kind of work done. The order is determined by the degree of learning difficulty. It is to be noted that these steps vary in height.

THE INSTRUCTION UNITS

Each of these groups is too long a step for the learner, so we break up each group, or step, as shown in Figure 2. The

first group, Elements of Composition, is broken up into five units as follows:

Unit I—Principles of Typesetting.
Unit II—Proving Composition.
Unit III—Distribution.
Unit IV—Style Aids in Composition.
Unit V—Calculation in Composition.

The other groups are similarly divided, and for each unit there is an Instructor's Guide. Each unit represents a step in

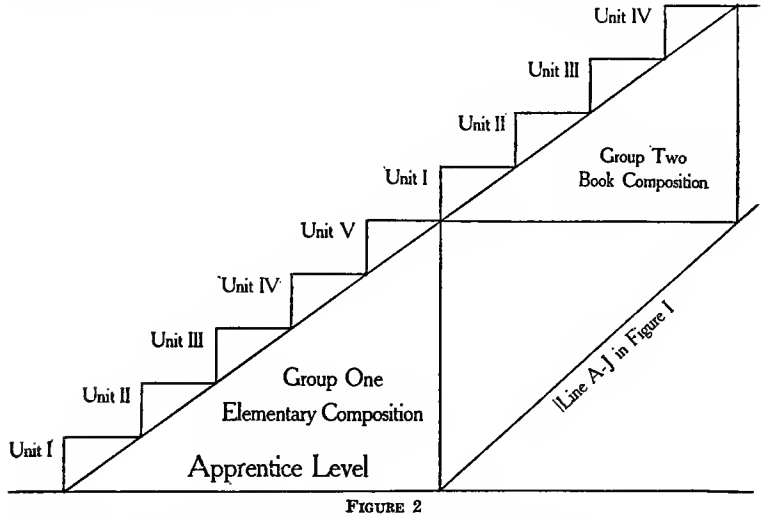

FIGURE 2

advance and has a definite measure by which it may be determined whether the apprentice is ready to take the next step. Thus, at the conclusion of Unit I, Group One, the apprentice before going on with Unit II should be able to set (from copy furnished in 8-point) ten lines 20 picas wide in 10-point, single leaded, in sixty minutes, with not more than four errors; and at the end of Unit II, he should be able to pull and correct proof as specified before going on with Unit III.

The Lessons

The instructional units are broken up into lessons, each of which aims to teach how to do a typical job like "Cleaning

and Caring for Type," or a certain closely related body of knowledge like "The Point System." See Figure 3. The first unit of Group One, Principles of Typesetting, consists of five lessons:

Lesson 1—Learning the Case.
Lesson 2—Using the Composing Stick.
Lesson 3—Justification.
Lesson 4—Spacing.
Lesson 5—Setting Various Measures.

The student climbs by these lesson steps from one level to another through the apprentice stage until he reaches the

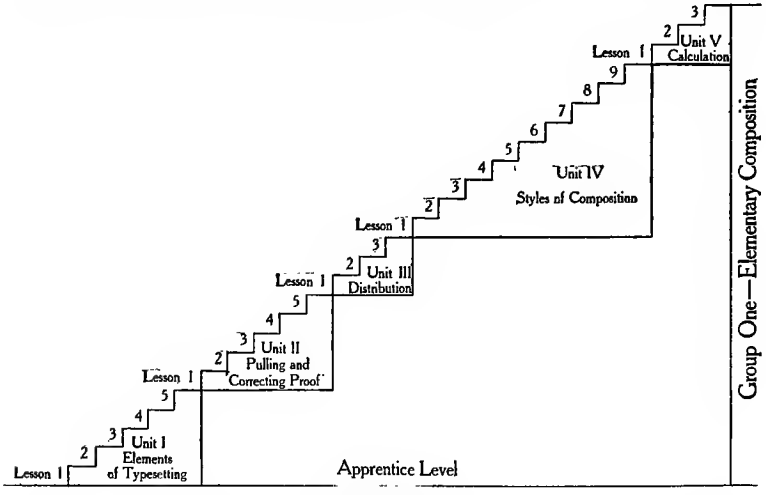

FIGURE 3

level of a journeyman. Each lesson is printed separately and contains:

1. Instructions to students.
2. Text material for study.
3. Specific jobs for practice.
4. Directions for performing each job.
5. Questions to review and test the student's knowledge.
6. References for further study.

These lessons are not arranged on the basis of time but on the basis of teaching a definite job or idea; some lessons

will take fifteen minutes and others from eight to ten hours. Each lesson sheet is intended to be self-teaching as far as possible. It gives to the student the necessary information concerning the job which he is about to perform, then it prescribes definitely his shop practice in a series of carefully graded exercises. At the end of each lesson is a list of questions calculated to prompt him in reasoning out the "why" of the work which he has performed as well as to test his mastery of the facts stated in the lesson text. The answers to these questions he is to write out in his note-book. Finally, with most lessons there are given a few references for further reading and study if the student is inclined or has been stimulated to go more deeply into the subject.

From the use of instruction sheets prepared and used in this manner certain advantages are gained:

1. The work of the instructor is systematized and much confusion eliminated.
2. The time of both students and instructor is conserved.
3. Each apprentice or student may progress individually as fast as he is capable of going without keeping the pace of the whole class.
4. The student receives training in following out written directions.
5. He is also trained to think and act independently without relying too much on the instructor.

Related Studies

In addition to the practical performance jobs and their auxiliary information through which the apprentice acquires the skills of the trade, there is a series of lessons in related technical information which he must learn if he is to do well the jobs in the trade for which he is training. These are grouped under American Social and Industrial History, English for Printers, Arithmetic for Printers, Design for Printers, and Health and Safety for Printers. These groups are intended to supplement the trade groups in such a way that the apprentice may become an intelligent

workman—one who can see the principles underlying his methods of work, who can give a reason for doing a thing

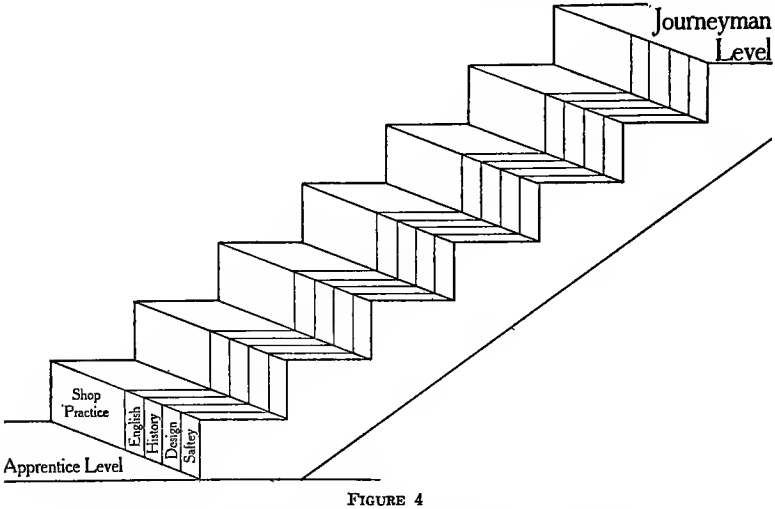

FIGURE 4

in a certain way, and who does not blindly follow a rule. In other words, he knows the *why* as well as the *how* of the trade.

This related auxiliary and technical information added to the specific trade operations prescribed in the shop practice, gives breadth to the stairway of trade instruction, as shown in Figure 4.

COURSES OF INSTRUCTION

It is not to be expected that the order of the lessons as published in the apprenticeship courses, will fit all conditions, or will even be the only working order for any given conditions. The arrangement is intended to be flexible and adaptable, and so constructed that lessons, units, and even groups may be omitted, added to, or interchanged. Moreover, the groups, units, and lessons may be arranged in courses to fit the needs of any apprentice or group of apprentices. Thus, for Cylinder Press Apprentices the following arrangement is suggested:

REQUIRED—

Group Eight, Cylinder Press—all units and lessons.

Group Seventeen, Power—all units and lessons.

Group Eleven, American Social and Industrial History—all units and lessons.

Group Thirteen, Arithmetic for Printers—all units and lessons.

Group Eighteen, Health and Safety—all units and lessons.

OPTIONAL—

Group Sixteen, Shop Routine—all units and lessons.

Group Fifteen, Pamphlet Binding—all units and lessons.

Group Six, Stone Work—Units 1 and 2—all lessons.

In some instances apprentices from different branches of the printing trades may be grouped for part of the instruction as shown in the table on page 20. Pending further experience, the U. T. A. Department of Education recommends the trial of courses as arranged in Appendix A.

REVISION OF LESSONS

With all of this intended aid to the instructor, you are cautioned against two possible objections that may develop from the use of these lessons. First, a teacher who has a tendency to minimum effort may accept this lesson material as it stands and settle down into a rut. Second, a really progressive instructor with initiative and originality may find that this system of instruction does not altogether coincide with his ideas. To overcome the inertia of the one man, and to utilize the contribution that the other may be able to make to his fellow instructors in printing throughout the country, let it be understood that the U. T. A. Department of Education disclaims perfection in these lessons in their initial form. The first edition is intended to be only a trial edition. It is desirable, however, that there be some standardization in the

COURSES OF INSTRUCTION

Course in Hand Composition

Required	Optional
Group One	Group Thirteen
Group Two	Group Fourteen
Group Three	Group Sixteen
Group Four	Group Eighteen
Group Five	
Group Six	
Group Twelve	

Course in Linotype Operating

Required	Optional
Group One	Group Thirteen
Group Two	Group Fourteen
Group Three	Group Fifteen
Group Four	Group Eighteen
Group Nine	
Group Twelve	
Group Seventeen	

Course in Monotype Operating

Required	Optional
Group One	Group Thirteen
Group Two	Group Fourteen
Group Three	Group Fifteen
Group Four	Group Eighteen
Group Ten	
Group Twelve	
Group Seventeen	

instruction system and material; also that the best ideas relative to the teaching of printing may be incorporated therein, so that eventually these lessons will be the very best that the composite printing industry of America can produce. In order to attain these ends, you are, therefore, advised to have your students use the lesson sheets, and yourself to follow the hints and suggestions in the Instructor's Guide until such

time as you may by experience have found a better lesson or a better way of teaching that lesson. Then you are requested to notify the U. T. A. Department of Education so that your improvements may be passed along to other instructors and theirs to you through the revisions that will be issued from time to time.

Questions

1. What relation does an analysis of the printing trades bear to the teaching of printing?

Allen, Chap. VI.

2. How would you classify the trade knowledge in your branch of the printing trades?

3. What is meant by the instructional order of jobs as contrasted with the production order?

Allen, Chap. XII.

4. How do you distinguish manipulative skill, auxiliary knowledge, and related technical information?

Allen, Chap. VII-XIII.

5. What is the advantage to the printer's apprentice in studying history? Arithmetic? English? Hygiene?

CHAPTER III

HOW TO TEACH

After selecting what is to be taught and arranging this material in a series of lessons, units, and groups as suited to the individual apprentice or group of apprentices, the next question is, *how* shall these lessons be taught? In answer to this question the U. T. A. Department of Education has prepared for each instructional unit an Instructor's Guide.

The Instruction Guides

Each Guide contains:

1. Qualifications of students for undertaking the work of the unit.
2. Aims of the unit or the attainments of the student upon completion of the unit.
3. The approximate time required to complete the unit.
4. The required equipment and materials.
5. The working conditions.
6. An outline of the lessons.
7. Suggestions for teaching each lesson.
8. Standards for rating the students.
9. A list of books of reference for the instructor.

You should not regard these Guides as dictatorial, authoritative, or exhaustive discussions. They are intended to offer helpful suggestions and to point out possible pathways for you to pursue. In order that you may be able to improve upon the suggestions contained in the Guides and develop a better procedure, it is our purpose in this chapter to give you some of the general principles of teaching.

Methods of Teaching

How the lesson is taught is usually referred to as the method of teaching. There is no universal method of instructing that may be called the best method, but experience has shown us that there are certain teaching principles with which the instructor must be familiar and in the use of which he must become skilled if he is to be a successful teacher. Method is to the instructor what design is to the printer; there are rules of design which the good printer never disregards, and there are rules of method which the good instructor never disregards. Both must recognize: (a) the conditions under which the rules are applicable, (b) situations where there is no rule, and (c) when rules apparently conflict. Like printers, instructors may be grouped into three classes: geniuses, artisans, and artists. The first class is so small that it may be disregarded. The artisan group is all too large and consists of those who mechanically follow rules and precedents, always smothering personality with the blanket of technicality. The artists recognize the value of rules and precedents but do not overrate them. They assert personality without developing fads and eccentricities. Freedom to them means conformity to the laws of unity. They make their own the best the world has to offer and in return give of their best, freely and cheerfully. The printing instructor should belong to the artist group in both his trades.

Essentials of Good Instruction

Good instruction means so guiding and directing the student that from his own experiences and from his contact with the experiences of others he may acquire the skill and knowledge which is aimed at in the lesson, unit, group, and finally, the course. In other words the process of teaching consists of creating or controlling the situation to which the student responds, and this response signifies the learning process operating in his mind and nervous system.

In creating or controlling the learning conditions, the instructor is largely concerned with two things: (1) arousing and keeping alive in his students the desire to learn, and

(2) providing material in such form that they may satisfy this desire. The first is the problem of stimulating interest which is discussed in Chapter VI, and the second is a matter of the lesson day by day.

Teaching is defined as *purposeful effort to help a learner to learn.* This means that the aim and end of teaching is concerned with the learner, and the methods and subject matter of teaching must be organized from the standpoint of his needs and the process by which he learns. It further means that the teaching process is not complete until the learner has satisfactorily mastered the new act of skill or fact of knowledge involved in the lesson. It is the teacher's duty, therefore, to make sure by the various devices of his art, that the student has attained the ends set up in the lesson. Mere telling or showing does not constitute teaching. The instructor is responsible not only for presenting the information, but also for controlling the learning conditions and securing the student's response.

How the Learner Learns

Remember that the student must always do the learning. There are two ways in which he may learn: (1) Through his own experiences, and (2) through interpreting the experiences of others. There is much truth in the old saying, "Experience is the best teacher." What a person gains through experience he remembers and uses; also he interprets the experiences of others only through his own experiences. Out of this fact grows the old maxim of teaching: "Never do for a student what he should do for himself."

But life is too short for an individual to gain all his knowledge through first-hand experiences. For this reason schools are established in which the knowledge and skill acquired accidentally here and there through trial and error by multitudes of individuals through the centuries, may be brought together and organized in such a manner that the student may acquire it in the shortest possible time.

One of the fine points in teaching is to know just how much the student must discover for himself and how much

he can get from the experiences of others. In vocational or trade work one thing is certain, namely, independent of *how* a student learns to do it, he must eventually acquire *all* the skills necessary to a successful practice of the trade, and it is the duty of the instructor to see that he does it.

The sources of knowledge and methods of learning may be expressed thus:

The student learns—

1. Through his own experiences.	a. By doing.
2. Through interpreting the experiences of others.	b. By seeing some one else do. c. By hearing some one else tell. d. By reading. e. By seeing pictures, diagrams, and charts.

The good instructor keeps up the interest of the student by constantly reaching him through all of these avenues and thus insuring his understanding of what is taught. Demonstration by the instructor is usually accompanied by some explanation, thus combining (b) and (c). A good written or oral explanation is usually accompanied by diagrams, charts, pictures, or the object itself. A blackboard drawing, diagram, or chart that is made as an explanation proceeds, is a good combination of visual and auditory instruction. In the final analysis, however, the real fixation of the knowledge is through its use by the student.

Laws of Learning

Having defined teaching as purposeful effort to help a learner to learn, learning may be defined as acquiring the knowledge or skill by the learner through study or purposeful effort on his part. The success of the learner's effort is dependent upon, or subject to, certain principles that are now recognized as the laws of learning which may

be stated as: (1) the law of readiness, (2) the law of exercise, and (3) the law of effect.

In order to understand these laws we must first recognize that learning is a mental process, and we must get an idea of how the human mind operates. Every mental act is regarded as a response to an exciting cause called a *stimulus.* All physical acts (that is, muscular motions) are produced by nerve action originating in the brain. Therefore, the muscular action is, in its final analysis, a mental action, and all skill in typesetting, press-feeding, keyboard operating, or, in fact, any physical act that the printer performs, depends on action of the brain and its subordinate parts in the nervous system. Learning (that is, acquiring a new skill or fact) thus means that the learner renders a response different than he has given before, and this new response must be excited by a new stimulus. This stimulus is involved in the new situation which the teacher deliberately sets up in his lesson organization.

The law of readiness means that when all mental conditions are favorable the desired response will readily be given. The response is sometimes more prompt and effective than at others. The delay is due to other thought channels or paths in the brain being open by reason of the student's attention or interest being on something else than the new thing set up for him to learn, or because the chain of thought centers necessary for the operation of the new impulse has not been properly connected up. The new response must come from a new thought center which the thought impulse must reach by traversing as much as possible old thought channels with a minimum of resistance in finally leaping to the new thought center.

This is illustrated in Figure 5 in which the group of dots between A and B represent thought centers which have been developed and between which thought impulses have previously passed over paths represented by the lines connecting the various dots. A new thought impulse sent from A to B might follow any of the possible connections from center to center, but would naturally follow the best developed

path as indicated by the heavy line. It will be noticed that this is not necessarily the most direct path, but is the easiest traveled path. (Sometimes our thinking proceeds by very roundabout routes.) It is desired to secure a response from thought center X when the source of the thought impulse (that is, the interest of the student) is at thought center A. The nearest center to X is at B, but no path exists between the two. It is the teacher's task to start the thought impulse from A to B, then lead it over to X on a new path. The passage over the route from A to B is easy because it has been traveled before, and the more often it is followed the easier it is to traverse again. The passage from B to X will be easier to traverse the second time than the first, and still easier each time it is gone over.

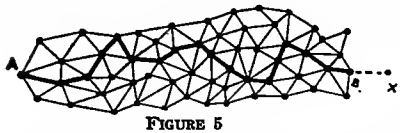

FIGURE 5

The law of exercise, then, means that the oftener and the more emphatically an impulse traverses a thought channel, the easier the connection becomes, and the more likely becomes a given response from a given situation. In other words, the oftener a person does a thing, the easier it becomes. The deeper the thought channel is worn, the more likely is the impulse to travel through it rather than through a different path, no matter how much shorter some other route may be. This is the reason why bad habits are so hard to break. It also shows the importance of getting the student to do a thing right the first time, for any act, right or wrong, leaves its trail which future impulses may follow and wear deeper.

The law of effect means that when the response gives satisfaction, the connection is strengthened between the situation and resultant response; or, in terms of our previous illustration, the tendency for the impulse to traverse the same channel is strengthened. Conversely, when the response is followed by annoyance, a repetition of it is less likely from the same stimulus. The teacher should therefore see to it that every exercise that he prescribes for his student shall have involved in its effect or consequence something that shall mean satisfaction rather than annoyance.

The printer's apprentice may find satisfaction for his effort in the success of the job, evidence of progress, approval by the instructor, outdoing some other fellow, or in the enjoyment of good workmanship which he has achieved. This topic is discussed further in Chapter VI.

Progress in Learning

Learning should be done with the greatest possible economy of effort on the part of both instructor and apprentice. It is to be noted, however, that economy does not mean sacrificing accomplishment to save time or energy. The efficiency of the instructor is measured by the total effort necessary for the student to achieve the complete accomplishment of the course. Note that this achievement must be made by the student. The unskilled instructor is apt to substitute his own effort for that of the student, thereby deceiving both himself and the student. The skilled instructor, then, is the one who knows how to *guide* and *direct* the activities (physical and mental) of his students in such a manner that they will attain the desired standard of achievement with a minimum expenditure of time and energy.

This is illustrated by Figure 6 in which is shown graphically the progress of three different students represented respectively by lines A, B, and C. Let us assume that they start at the same time to learn to set type, all having zero skill, that is, knowing nothing about typesetting. Let the divisions along the bottom of the scale represent periods of time, say months, that have been spent in study and practice, and the divisions on the vertical scale represent the number of ems of ten-point type that can be set in one hour. If learning conditions are alike for each student, the progress of each would be identical and shown in the same line. But there are variations in the conditions, resulting in different curves or lines of progress for various students. At the end of the first month, student A can set 150 ems per hour, student B 75 ems per hour, and student C 125 ems per hour. The interesting and important question now is, what causes this difference in the rate of learning? What are the variables

entering into this situation? There may be two: 1, the students may have varying capacity for learning; or 2, the instruction methods may be different.

If the students are of equal ability, the variation must be due to difference in instruction methods. If the same

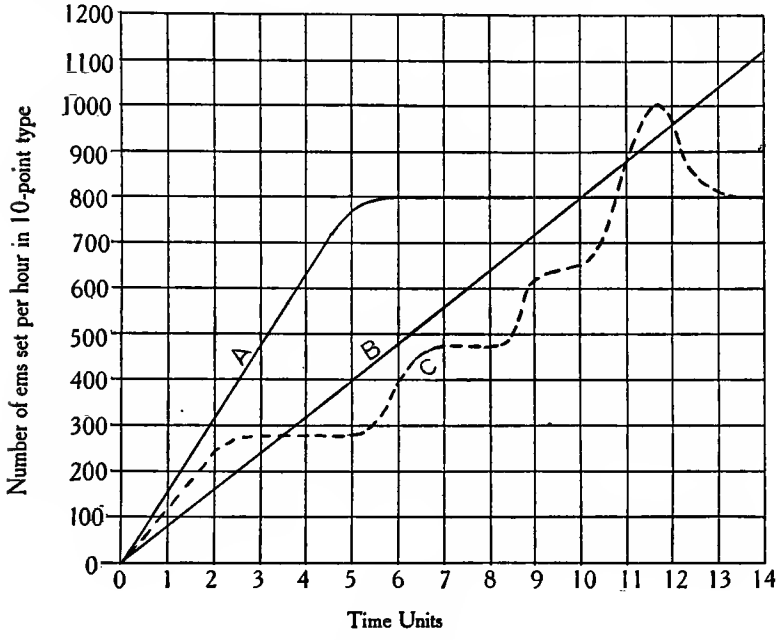

FIGURE 6

instruction methods were used in each case, the varying rate of progress must be due to different capacity or learning ability of the students. Now, instructors who have not studied deeply into the underlying principles of their work are prone altogether too readily to ascribe the difficulties of their students to the last-mentioned factor, whereas, in truth, the unsatisfactory progress of students is too often due to poor teaching methods. If the three students were of the same ability but each had a different instructor, then the instructor of A would be twice as efficient as the instructor of B because his student has made twice as much progress in the same length of time.

Again, the rate of improvement in skill is not constant for any individual. Experiments in learning such skills as typewriting or telegraphy show that the learner usually makes a strong initial spurt, then his rate begins to slow up and he reaches a stage where no increase in rate is achieved for a time; then he increases again until he reaches the next level of stationary progress, and so on. The line of progress for student C illustrates this; at the end of the first period of time his rate of speed was 125 ems per hour, at the second period 250 ems, at the third period about 275 ems, which rate remained the same through the fourth and fifth periods, but in the sixth period an improvement is again shown, continuing through the seventh period when he reaches about 475 ems per hour and continues at this speed until into the eighth period, then goes through another period of improvement, and so on through successive rises and plateaus until he reaches the normal or standard journeyman rate of 800 ems per hour.

The meaning of these plateaus, and whether or not they can be entirely done away with in any curve, is a matter of dispute. These pauses may be necessary for some of the habits to reach a certain degree of perfection before further progress can be made. However this may be, there are several minor causes which tend to increase the number of plateaus and to lengthen the time spent in any one. In the first place, an insecure or an inaccurate foundation must result in an increase of plateaus. If at the beginning, during an initial spurt, for instance, the learner is allowed to go so fast that what he learns is not thoroughly learned, or if he is pushed at a pace that for him makes thoroughness impossible, plateaus must soon occur in his learning curve. In the second place, a fruitful cause of plateaus is loss of interest,—monotony. If the learner is not interested, he will not put forth the energy necessary for continued improvement, and a time of no progress is the result. The attitude of the learner toward the work is extremely important, not only in the matter of interest, but in the further attitude of self-confidence. Discouragement usually results in hindering progress, whereas confidence tends to increase it. The psychological explanation of this is very evident. Both lack of interest in learning and the presence of discouragement are likely to result in divided attention, and that, as has already been shown, results in unsatisfactory work. A third cause for plateaus is physiological. Not only must the learner be in the right attitude towards the work, but he must be physically "fit." There seems to be certain physiological rhythms that may disturb the learning process whose

cause cannot be directly determined, but generally the feeling of unfitness can be traced to a simple cause, such as physical illness, loss of sleep, exercise, or food, or undue emotional strain.

—STRAYER AND NORSWORTHY, How to Teach, pp. 63, 64.

MAXIMUM EFFICIENCY

What determines the journeyman standard of 800 ems per hour for hand composition in ten-point type? This is the average rate at the present time, but a few years ago it was 1000 ems per hour. Many swift compositors have made 1600 to 1800 ems, and a speed of 2100 ems is on record. Why has the former average been reduced? Can it be restored or even exceeded by the introduction of proper methods? Has the instructor any duty or responsibility in this matter? Shall students be trained only up to the minimum speed accepted in the trade today, or shall they be overtrained? What is the maximum achievement to be expected of students?

The reduction in the former speed for hand composition is due to the use of machine composition which now handles practically all of the straight matter on which speed records could be made, leaving to the hand compositor only the irregular or special work. In this situation it is not to be expected that the old standard can be restored in trade practice, but it is true that the hand compositor today still has the capacity for the former record, for the introduction of the linotype or the monotype have not changed human nature. This statement answers some of our questions.

The other questions, which are as applicable to every other branch of the printing trade as to hand composition, may be considered in accordance with the laws of learning. First, however, let it be recognized as a fundamental ethical principle that upon every man rests the moral obligation to render to society his maximum of productive effort. Upon the instructor, therefore, rests the responsibility for bringing every student as near as possible to this maximum.

Returning to our illustration in Figure 6, shall the student's rate of progress follow the line of A which shows a

maximum rate of improvement up to the level recognized as the present journeyman standard, then continue forever on this level? Shall it follow the line C in a succession of rises and plateaus to a point above the journeyman level, then settle back to this level? Or shall it follow the line B, ever rising at a constant rate and with no maximum limit? The latter proposition would be ideal but is impossible, for unquestionably there are limits to human capacity in any line. The line C more nearly represents the actual situation, but is not true for all persons, for no two individuals have the same capacity.

The problem for the teacher is, first, to organize his instruction in such a manner that the line of progress for each student will be as constant as possible, eliminating the plateaus; and second, to continue the improvement in skill to the very maximum of each student's ability. If the student later settles back to a lower level than he is capable of maintaining, it should be due to other causes than faulty instruction.

Notwithstanding the moral obligation which we have mentioned, very few men work up to the level of their possibility; the majority continue much below their limit of efficiency in most of the habits required by their trade. Upon the instructor, therefore, is placed the responsibility of directing the formation of trade habits on the part of his students that shall enable them to give maximum production.

Forming Trade Habits

Putting the matter of maximum efficiency in learning and performance upon the basis of forming correct trade habits, let us consider briefly some of the principles of habit formation.

The efficient workman is the one whose motions are performed repeatedly with surety and precision and with a minimum of attention. As a result of repetition his acts have become automatic, obeying the law of exercise. *Repetition*, or drill, then, is the first principle of habit-forming and is one of the most valuable teaching factors. It is, however,

a part of the teacher's skill to know just how much repetition to require. Practice periods should not be so long as to induce fatigue and discomfort in violation of the law of effect. They should be frequent and regular. The learning practice of any given act should cease when maximum proficiency is achieved, that is, when the increase in skill stops or is no longer profitable in proportion to the time and energy expended.

A second principle of habit-forming is *invariability*, that is, the act should always be done in the same way. The old saying "Practice makes perfect," means perfect reproduction of any act or performance whether right or wrong. It is essential for the instructor to see that the act is correctly performed every time and especially the first time, for, whatever way it is done, it leaves its corresponding trail in the nervous system which succeeding impulses may follow whether this be the path of the right or wrong way to do a thing. A workman may become just as proficient in the wrong method as in the correct method. A bad habit is difficult to break because its groove is so deeply worn. The instructor should therefore be on guard against the wrong performance of any act of skill which he is trying to teach. Never allow an exception to the correct procedure.

In establishing a new habit, *intensity of the first impulse* is also a valuable factor. The more force behind the stimulus, the more definite is the path made by it and the easier it is to send a second impulse over the same trail to the desired response. A teacher, then, should seek to give as much emphasis as possible to the new lesson he is trying to teach. Let the new act be prompted by as strong a stimulus as possible. Devices of illustration, experiment, novelty, contrast, etc., all help to give intensity to the new impulse.

The principle of *satisfaction* must also be considered. The law of exercise alone will not suffice in habit-formation, at least for the kind of habits that the trade teacher wishes to establish. Mere repetition, even with all the emphasis or intensity that can be brought to bear, will not produce habits of action the results of which are not satisfactory to one who

performs the act. The law of effect must be recognized as well. A man will repeat and make habitual only those acts that result in some kind of satisfaction for him.

> Pleasure in the broad sense must be the accompaniment or result of any connection that is to become habitual. The satisfaction may be of many different sorts—physical, emotional or intellectual. It may be occasioned by a reward or recognition from without or by appreciation arising from self-criticism. In some form or other it must be present.
>
> —STRAYER AND NORSWORTHY, How to Teach.

DEVELOPING TRADE JUDGMENT

The principles of habit-formation are important for consideration in teaching highly specialized or repetitive operations such as feeding a press, or operating a keyboard of a typesetting machine, and to some extent in setting type in the stick, and in distribution. These are the portions of the printer's work that require a minimum of thought content and a maximum of reflex action. They are the responses that may become largely automatic and represent the production activities for which operatives may be trained, or which may even be perfomed by mechanical means. It must be recognized, however, that the human mind is more than a machine, and the good printer is more than an operative. As important as specialized trade habits may be, there is another important aspect of the printer's work that we will consider, namely, trade judgment.

In the higher thought levels the human mind operates in certain definite ways. (1) It *analyzes* a situation into its elements or factors. (2) It *recognizes* certain of these elements that have formerly been in one's consciousness (an act of memory). (3) It ascribes or infers meaning in these elements or combinations of them. In other words, it *interprets everything in terms of purpose.* (4) It *abstracts* from concrete experience *general principles of procedure.* Past experiences are raised to the level of reflective consciousness and their bearings upon the immediate situation are more or less clearly considered. (5) Finally, it *selects the elements, and methods of procedure* with reference to a new end to be attained.

For the printer, then, trade judgment means that he can select out of any situation the elements and procedure best suited to his purpose. To illustrate, let us take the situation: a job setting up a letter-head. Some of the factors of the situation are: the customer, the use to be made of the finished letter-head, the paper on which it is to be printed, the style of type face, arrangement of type mass, and the working conditions in the shop. Each of these can be further analyzed out into several other elements. The printer must recognize all these elements, then select and arrange them into a course of action to accomplish his purpose. His success will depend upon the degree to which the elements and procedure chosen by him shall render the most satisfactory results.

For the teacher, the significance of this matter of trade judgment lies in the fact that each of the five factors of judgment mentioned above are susceptible of improvement by training. The organization of the instruction program should provide ample practice for the student in analyzing a job into its elements, finding the fundamental meaning or purpose of the job, determining general principles of procedure applicable in the case, and finally selecting the best combination of elements and method of procedure for performing the job. The student's first efforts will be crude and imperfect. The instructor must carefully watch him at each step of the judgment process, giving such guidance and assistance as may be necessary.

Questions

1. What is the difference between teaching and learning? Between teaching and telling? Between teaching and showing?
2. What two definitions of teaching are given in this chapter?
3. What determines the efficiency of teaching?
4. List out as many as you can of the factors that enter into a teaching situation.
5. Which should a student develop first, speed or accuracy? Why?

6. Why is it important to guard against the failure of a student in any first attempt?

7. Why is it important to set a high standard for the student at the outset?

8. Why is extreme care necessary in warning students against wrong ways of doing any job?

9. List out some specific habits of workmanship that you should seek to develop in your students.

10. What methods can you propose for determining the progress of your students in forming these habits?

11. Define "learning a trade" in terms of habit formation.

12. What determines the limit in the value of drill as a teaching factor? Explain by a concrete example.

13. Criticize an unsatisfactory job in printing from the standpoint of trade judgment.

References

Allen—The Instructor, the Man and the Job. Chapters XV, XVI.

Strayer and Norsworthy—How to Teach. Chapter IV.

Colvin—The Learning Process.

CHAPTER IV

INSTRUCTION DEVICES

From many years of experience in helping learners to learn, teachers have found out a few expedients or schemes that have proved useful and feasible for this purpose. Skill in teaching means knowing what method or combination of methods to use in a given situation to obtain the desired results; that is, as we have said before, to help the learner to acquire the desired knowledge or skill with the least expenditure of time and energy. The most common devices or "tools" of the teaching trade are:

1. The Oral Recitation.
2. The Written Recitation.
3. The Lecture.
4. Questioning.
5. The Demonstration.
6. The Illustration.
7. Practice in the Job.
8. The Experiment.
9. The Examination.

We will now discuss the use of these devices, or, in other words, try to explain some tricks of the teaching trade. Before taking up these methods separately, it may be stated as a general principle that the teaching method chosen must be determined with reference to a few fundamental conditions, such as age and qualification of students, subject matter, aim of the lesson, and the teaching conditions.

1. The Oral Recitation

In educational institutions the usual instruction plan is for the learners to be assembled at stated periods in a class

room before the instructor who directs their learning according to the various methods which we are discussing. In ordinary school room practice one of the most common methods of procedure during this class period is for the instructor to call on various students to "recite," that is, to repeat from memory or otherwise the facts or principles that they have acquired from previously assigned study. When the recitation of the lesson assignment has been covered, a new assignment is made and the class dismissed, to return at the next stated time. For instruction in the related subjects of the Standard Apprenticeship Lessons for Printers, much use can be made of this method of procedure; but for the actual shop work instruction, the plan must be considerably modified, and the recitation period must partake of a different character than a quiz. In the printing trade the facts that must be committed to memory are relatively few, and the apprentices being older and having specific interests and purpose, may be instructed more profitably by other methods. There is, however, much advantage in assembling the group of students at stated periods so that certain information directly related to their trade performance can be presented in an orderly and systematic manner.

For the benefit of the shop teacher who has not had pedagogical training some suggestions are here offered for the conduct of this class period.

1. The class should assemble punctually. Do not tolerate straggling by any students. The example and attitude of the instructor himself will largely control this matter. If he is punctual, methodical, and masterful, he will receive a like response from his students. An effective device for securing punctuality is to call the roll promptly on the minute for the class to begin. This should be done whether the class is assembling for a shop work period or a recitation period.

2. The class room period should not be too long. One hour should be the maximum. Half-hour periods thoroughly prepared and skilfully conducted are better than one-hour periods of easy-going dawdling. The trade teacher

usually has to take his recitation period out of shop work time, and he should remember that his students need a maximum of practice and performance with a minimum of talk and theory.

3. The class should be properly seated. Where the shop is in charge of only one teacher, the recitation seats may be in a section of the shop. This gives the advantage of having the equipment and materials readily accessible for illustration and demonstration. Where several instructors work in one shop, it is better to have a class room separated from, but adjacent to, the shop, so that the recitation periods of any one class may be held without annoyance from others. For shop work classes, chairs and tables or tablet-arm chairs are preferable to the schoolroom type of desk. Occasionally it is desirable to call the class together around some machine to explain some special feature. In this case students cannot be seated, but perfect order should be insisted upon.

4. A reaction from students should be secured. During this class period, the instructor will present his subject matter in the form of lecture, demonstration, illustration, etc., as will be discussed later, but he should give opportunity for students to respond by asking questions or engaging in discussion. The success of the teacher's presentation is oftentimes shown by the discussion which it provokes. The instructor should, however, always be master of the situation, holding the discussion strictly to the point, and not allowing it to become side-tracked or upset by frivolous conduct of any students. A discussion is likely to be of more value with a class of older or advanced students than with beginners.

2. The Written Recitation

In the strict schoolroom sense of the term, a written recitation means giving to the class a set of questions relative to the lesson assignment and requiring each student to write out the answers to all the questions. This of course gets a reaction from and tests out all the students at the same time.

With similar purpose some trade instructors, in an effort to compel all students to do certain study or research, use the device of issuing sets of questions which students are to answer in written form. The writing of these answers is usually done as "home work," that is, outside of class hours.

The advantages of this method over the oral quiz are: (a) it permits more thorough answering of questions; (b) it requires each student to do the work; (c) it compels independent work (copying or collusion should be discouraged); (d) it acquaints students with sources of original information in the references consulted; (e) answers can be more carefully examined and criticized by the instructor. It has disadvantages, first, of requiring considerable time and effort by both students and instructor (and the value of this time should be carefully considered); and second, of being a bugbear to certain students who have little aptitude for written expression although they may be very loquacious orally or excellent in the manual performance of their course.

This method is more justifiable when the written answers to the questions are preserved in an orderly manner in a note-book to which the student can make frequent future reference. At the close of each lesson in the Standard Apprenticeship Courses are given some questions for this purpose. The instructor should see to it that the student faithfully performs this part of the work. Answers should be neatly written in ink. The loose-leaf type of note-book is of advantage because it permits the writing and handing in, at the completion of the unit, of a single set of answers requiring but a few sheets, and the instructor does not have to handle the whole book each time. The habit of recording in the note-book information or data that will be valuable for future reference is one that every instructor should encourage on the part of his students by every means possible.

3. The Lecture

As used in this discussion the term lecture means imparting information by one person to another person or group of persons by means of the spoken word, whether in an

informal talk or on the more formal occasion where the speaker addresses a large audience.

This old and much criticized instruction method contains both advantages and disadvantages for the teacher of printing. It is often the only means of presenting certain information by reason of the lecturer possessing knowledge that is not available to students in any other way, as in case of the instructor who has made research and experiments in connection with paper or ink manufacture, styles of advertising and design, etc., or the expert sent out by the manufacturer of some special machine to impart information that is not yet in print.

Even if the subject matter is to be found in books, it is often a saving of time for the class to have it organized and delivered to them by some one person in a few minutes rather than requiring all members of the group to study it individually, thus multiplying the total time devoted to the subject. The personal inspiration of the speaker and his ability to vary his language and inflections gives to the lecture the possibilities of explanation, illustration, or emotional appeals to suit the needs and response of the hearers, which is not possible with the fixed printed page.

The objections to the lecture method are: that the hearer is merely a recipient gaining his information too easily to be appreciated; that the instructor has no means of testing his hearers to determine whether they have mastered and can apply his talk; and that the method lacks interest on the part of the students. The force of these objections lies in the abuse rather than legitimate use of the lecture. The following precepts are offered to help instructors to avoid the misuse and secure the advantages of this teaching method.

1. Lecturing should not be overdone; in other words, the teacher should not talk too much. It should be mixed with other forms of instruction and used to supplement them rather than being the primary method. For teaching shopwork subjects it should be reduced to a minimum, and

should be conducted with utmost discretion. It is oftentimes better to call the class together around a machine or a live job under way to explain some particular phase of the work as it arises, than to try to incorporate this information in a formal lecture given at some fixed time and place more remote.

2. Lecturing should be adapted to the character of the students. For advanced apprentices or journeymen taking extension courses in evening classes, that is, for men who have considerable foundation in trade experience, some of the finer points of the trade may be brought out by a speaker and comprehended by the hearers without very much accompanying shop practice. Beginners, however, require more performance for themselves and less talking by the teacher.

3. A lecture should be carefully prepared in advance with the outline clearly and distinctly formulated so that the natural sequence of thought can be readily grasped by the hearers. Often it is advantageous to give to the class in advance an outline of the talk to be given. This may be written out on the blackboard, presented in printed or mimeographed sheets, or dictated for the class to write in note-books. This plan is of particular value when a series of talks is given, both as an incentive to the instructor to make thorough preparation of his talks and stick to his subject, and as a means of helping students to get the whole series in complete and logical form for study and future reference.

In outlining a lecture do not use too many main divisions. Three or four is usually enough for any one session. A lecture introduced by a statement that it proposes to present or discuss the topic under certain three or four points is more likely, because of its definiteness and sequence of thought, to get the attention of the hearers than one that rambles on without the plan being apparent. The subdivisions of each main point should also be clearly developed and presented.

The beginner at the teaching trade is urged to make very careful preparation of his talks. He should by all means

avoid the loose, wandering, digressive, repetitive discourse that comes from poor preparation, that does not secure the interest of the hearers, and that really means loss of their time in listening.

4. A lecture should not last too long. Usually fifteen minutes is long enough for an instructor to talk continuously. Thirty minutes should be the maximum. There are very few situations, in school or out, where an address of more than thirty minutes is justified.

5. A lecture should lead to action. This may be in the performance on the job which the talk has explained, in discussion or questions by students or in further study of topics in which interest has been aroused by the lecture. The instructor should always encourage a come-back by his students as a means of testing whether he has succeeded in putting across his purpose in the talk. The lecture belongs to the presentation phase of the lesson which, as we shall see later, is only one step in the whole lesson procedure, and therefore only a part of the teaching process. The teacher's responsibility does not end when he has merely told the student something.

6. The lecture should be used only when it is more profitable than any other method on the basis of learning economy; that is, it should be deliberately chosen as the presentation method because it will enable the student to acquire the information content of any given lesson in less time or with greater thoroughness and effectiveness than any other method. Too often it is indiscriminately used by the instructor because it is for him the line of least effort rather than the best method for helping his students to learn.

4. Questioning

The question is one of the teacher's most important tools. It is a simple means of setting before the student a situation that will bring a desired response. By means of questions the one who knows may skilfully lead the learner to discover things for himself through mental processes of analysis, comparison, association, and selection of ideas. Good

questioning, then, is a large factor in good teaching, and skilled instructors use this device more frequently than any other. Because it is easier to tell than to develop an idea through questioning, the untrained or the lazy instructor usually abuses the lecture method by doing too much telling and not enough questioning.

The purposes of questioning are:

(1) To reveal the student's mind to himself—to get him to realize what he knows and what he does not know.

(2) To reveal the student's mind to the instructor—to find out what the student knows and what he does not know.

(3) To guide the student in the discovery of new facts and in the acquisition of knowledge.

The kinds of questions classified according to purpose are as follows:

1. *Drill questions* are used when it is desired to test the student's mastery of facts. This type of question depends on memory only and is the kind employed in set lists of questions and answers (catechism) which is not as much used by good teachers now as formerly. In the printing subjects there are relatively few fixed facts that need to be established in memory by sheer repetition and tested by drill questions. The informational part of the trade can better be acquired by processes of reasoning and association of ideas. Therefore, the drill question is of little value to the printing teacher.

2. *Development questions* are employed to lead the student to the discovery of a new fact or principle. Having in mind the thing that he wishes to bring out, the instructor, by a question connecting somewhere in the learner's experience, brings up some other fact that the student already knows, then by the series of questions leads from this known fact through related known facts to the new principle that he wishes the learner to aquire. The responses given to the

questions presented may involve recall of ideas, comparison of ideas or facts, analysis of ideas or concepts, selection of alternative ideas, or organization of ideas into new concepts.

The following is an example of the use of development questions:

Example: Instructor wishes to bring out principles of construction of a wood-base electro.

Q. Of what two different materials does this electro consist? (Passes out wood-base electro for observation.)

A. Wood and metal.

Q. Why use two materials instead of only one?

Student is unable to answer. Instructor then asks series of questions, such as:

Q. *a.* How many impressions can be taken from an ordinary type form?

b. Is wood softer or harder than type?

c. Will you suggest one reason why plates are not made from wood?

d. How is type made?

e. Can wood be "cast"?

f. What is the only method of getting a printing face on a wood block?

g. Will you now suggest two good reasons why printing plates are not made entirely of wood?

h. Why not make the electro entirely of metal?—

and so on with other questions until the following facts are brought out:

1. Electros are not made entirely out of wood because:

   a. Too soft to make a big run.

   b. Too difficult to get the necessary printing surface raised on wood.

2. Electros usually are not made entirely of metal because:

   a. Too heavy.

   b. Too expensive.

3. *Examination or review questions* are used to test the present knowledge of the student and to recall past instruction; also to assist the student in organizing and classifying his knowledge. This phase of questioning will be discussed later in connection with examinations.

4. *Secondary questions* are usually asked for the purpose of giving the student a chance at self-expression. They usually require a descriptive answer and have no measure of right or wrong, since they call for the student's opinion. In this class may also be placed the questions that propose big problems to be solved that stimulate to further research; questions the response to which is further questions or investigation into new fields of knowledge based upon an appeal to the scientific imagination.

Examples: How can the printing of colored pictures be simplified? Can a simpler name be found for the letters that are now called "lower case" letters?

Hints on questioning. There are a few suggestions that beginners in teaching might well heed in the matter of questioning.

1. The questioner should be sympathetic. Encourage the student; do not make him feel that he is in the witness box with the opposition lawyer putting him through a cross-examination for the purpose of tripping him.

2. In group instruction state the question before calling the name of the individual who is to answer. The whole class should be ready with the answer.

3. Vary the order of calling on individuals. Do not go around the group in any given order that will enable any one to anticipate just when he is to be "called on."

4. Do not repeat questions or answers unless for some good reason. All should be paying attention or take the consequences.

5. Give time to think between stating the question and calling for an answer.

6. Make the questions clear and concise.

7. Use good English in asking questions.

8. Do not ask questions that can be answered by "yes" or "no." There is always an even chance that the answer will be right whether or not the student knows anything about the question. Such questions do not *stimulate thought.*

9. Require answers to be stated in complete sentences. Do not accept single word answers. By requiring complete statements, valuable training is secured in the use of good English, especially with younger students.

10. The question should not give a "hint" at the answer. Such questions are a detriment to *thinking.*

11. The question should not involve too much in its scope or content. Avoid the double or compound question.

Good questions stimulate thought on the part of students; they bring a prompt and definite response, and accomplish this result with a minimum expenditure of time. The instructor should, therefore, prepare in advance the main questions which are to be used in the lesson. The analytical mind makes a good questioner, and an analysis of the lesson to be taught helps any instructor to become a good questioner. Eternal vigilance is the price of success. The ambitious instructor will be self-critical and improve by correcting his own mistakes from day to day.

5. The Demonstration

In teaching another person to perform any act of skill, a most natural method is for the instructor himself to perform the act in the presence of the learner. In printing there are many skills that can be taught more readily in this manner than in any other, such as holding the composing stick, picking up type, emptying the stick, distributing type, and feeding the press. A few principles or maxims relative to the use of this method are here offered for the guidance of inexperienced teachers.

1. A demonstration should always be performed with real tools and materials, and under actual working conditions as far as possible.

2. The materials and conditions should be prepared in advance, as well as the outline of the procedure. Students should not be kept standing around while the teacher is getting ready, nor be required to witness and listen to an exhibition that has not been carefully thought out. They will respect their instructor in proportion to his thoroughness.

3. Before beginning, be sure that all students can see every motion and detail. Let nothing be concealed. Consider both the arrangement of your materials and the position of students.

4. In beginning, state definitely what you intend to do or show. This sets in the minds of your students an objective which helps to hold their attention.

5. Carefully analyze your own motions and explain each operation as the demonstration proceeds. Skilful use of questions will help students to reason out and anticipate certain operations, thus keeping their interest keyed up.

6. The performance by the instructor should be followed by ample practice by the student. The latter may observe and think he understands, but he must actually do it himself to master it.

7. Do not do the student's work for him by demonstrating on his tools or materials to the extent of depriving him of adequate practice. After you show him how to set a composing stick, loosen the clamp so that he must set it himself; or if you take his first lines of type from his stick to show him how to transfer from stick to galley, replace the type so that he must do it also. When you sketch a layout for a job that he is to perform, after explaining the principles underlying it, conceal your sketch and require him to make his own sketch.

8. Remember that the purpose of the demonstration is to help the student to learn, not merely to exhibit your superiority or cleverness. But remember also that he is to imitate you, and that he is not likely to develop a standard of workmanship higher than you set for him. Put your best effort into every demonstration that you perform so that

your students may recognize and respect your skill, but do it all in a spirit of aiding them to acquire the master touch of craftsmanship.

6. The Illustration

Closely akin to the demonstration is the illustration as a teaching device. The chief difference between the two is that the demonstration deals with *actual* tools, materials, and working conditions, while the illustration uses things that are *similar* to the real thing. For the illustrative method to be successful, the student must already have had experience with some of the elements of the subject under discussion so that from this experience he can make the mental pictures suggested by the illustration.

This method can be used where demonstration is impossible. An instructor may take a class into a room away from the noise and confusion of the shop, and by using pictures, models, diagrams, or exhibits of various materials, can bring out many interesting and valuable points related to the work under way. Examples of this are specimens showing the evolution or manufacture of type matrices or molds, and materials taken from different stages of paper-making or ink manufacture. Very valuable for explaining the operation of intricate machines, such as the linotype or monotype, is the practice of having different sections of these machines mounted on stands or boards in such manner as disclose working parts that are concealed in the machine when in operation. Wall charts or printed cuts are also useful for this purpose.

The danger in the use of illustrative materials lies in the fact that it is often easier to illustrate than to demonstrate, and the instructor who has a tendency to minimum effort is therefore more likely to use it. Remember that for securing actual performance from the student, the demonstration is always preferable. Illustration should be used to supplement by explaining intricate or involved parts or operations, but not as a substitute for demonstration.

7. The Experiment

As a teaching device for developing in students an attitude of independent investigation or research through systematic and orderly procedure, the experiment possesses possibilities that have not yet been realized by printing instructors. It may be utilized to advantage in many phases of printing, such as studying effects of colors, use of various kinds of ink and papers, spacing and arrangement of type mass, etc. An experiment may be performed by the instructor in the presence of the class, but students should also have opportunity to try out a number of experiments in order to establish scientific methods of procedure and lift them above the realm of guesswork.

The general purpose of an experiment is to seek to discover some fact or result by making a series of trials in a situation in which all conditions and factors are under control, with one factor being definitely varied in each trial and to which the varying results of the trials can be definitely ascribed. A few suggestions concerning the conduct of the experiment are here offered.

1. An experiment should always have a definite purpose or aim. It should seek to solve some specific problem or to discover the conditions which will produce a desired result. For example, what hue or tint in ink color will give the most satisfactory results with a given type form and sample of paper stock? This may be determined by a series of careful trials.

2. All conditions and factors necessary for the investigation should be selected, and the constants and variables identified. By constants is meant those conditions and factors which are the same in every trial; variables are the conditions or factors in which there is change in the different trials. The most conclusive results are obtained when there is but one variable. In the example mentioned in the preceding paragraph, we should set up as constant conditions a given type form, a given sample of paper with enough sheets to provide one for each trial, and a given kind of ink

to serve as a base. The variable would be the other color of ink to be mixed with the base ink.

3. The procedure must be methodical and orderly. The series of trials should represent carefully graded modifications in the variable from least to greatest, or *vice versa;* that is, the experiment should cover the whole range of possible variations within the limits set up. In our example we will take the first proof on our selected paper, using only the base ink. A given quantity of this ink by measure is to be used in each trial, but into this quantity is to be mixed for each trial a definitely increased quantity of the secondary color.

4. A record should be made of each trial giving the degree of the variable and the results. In our example, this record consists of the proof pulled from each trial. On it should be written the number of the trial and the quantities of the ink mixture.

5. The results of the different trials should be carefully studied, and the set of conditions giving the most satisfactory results should be selected. Any result or effect can be accurately reproduced without guesswork by referring to the record of the trial giving the desired effect. In our example, the same mixture of ink can be made because the record tells its exact proportions.

The experiment can be used to advantage in teaching such topics as color harmony to bring out the expression of harmony by contrasted colors, by complementary colors, by related colors, by unrelated colors, or by dominant colors; also in display composition to bring out principles of emphasis through contrast, harmony, proportion, balance, spacing, etc.

Partaking somewhat of the nature of the experiment is the frequently used teaching device of having students collect specimens or samples of various kinds. To be of utmost experimental value, such collection should include as wide a range as possible of specimens of the kind that is being studied. To study only one or two may be of some value as illustration, but students should be taught to be thorough in their study, not limiting their observations to,

or drawing conclusions from, a narrow or superficial range of examples or trials.

After collecting the specimens, the student should examine each one, compare with the others, classify, and arrange in order. He should then evaluate each specimen by determining its relative and specific worth; that is, he should decide for what uses each is best adapted and give the reasons therefor. This general procedure—collecting, examining, comparing, classifying, and evaluating—will help students to acquire orderly methods of study and enable them to do much original and independent research in various phases of their work as printers. Each student in hand composition should set up and make proof of every size of each type face in the shop, then study these type faces and determine their appropriate uses. Specimens of paper stock and examples of advertising and display can be collected and studied in the same manner.

The printing industry in all its branches offers unlimited opportunity for investigation and research. New methods and devices are constantly being introduced and each one opens up a still larger field for further study. The discovery of better ways of doing things or the development of new principles and processes can no longer be trusted to luck or accident. We have passed the age when "trial and error" was the chief method of learning. The new scientific age deliberately seeks out *the best methods* by trying out systematically all possible methods under all possible conditions. This point of view instilled into the minds of our apprentices will develop a generation of printers who are able to select wisely the most efficient ways of doing their work, or can profitably adapt themselves to the new conditions which this progressive industrial age is imposing with ever-increasing frequency.

8. Practice on the Job

Mere telling or showing will not enable a learner to perform an act of skill. With all the lecturing, demonstrating, reciting, or studying, the student must finally "learn to do

by doing." Certain muscular co-ordinations and nervous reflexes can be established only by actual practice. No instruction system has yet been devised or is conceivable from our present understanding of the learning process, which will enable the apprentice to acquire the requisite skill in any other way. The instruction methods previously discussed are useful in aiding and facilitating the learning of the informational content of the trade, but are not substitutes for real performance under actual trade conditions. Therefore the way to teach a youth to do the work of a printer is to place him in the print shop with access to the printer's tools and materials and let him proceed to perform the work of the printer. In this situation, skill in teaching consists in analyzing the work of the printer into its simple elements or operations, arranging these operations in a progressive scale according to learning difficulty, and setting the apprentice to mastering them one by one. The selection, arranging, and assigning of these operations, and testing the student's proficiency in their performance, constitutes the major part of the work of the teacher of printing. We will briefly summarize here a few pertinent points which are more fully discussed in other parts of this manual.

1. Practice should be performed under actual trade conditions. In printing this is entirely feasible, for every item in standard printing equipment can easily be introduced into the school print shop.

It is essential that the beginner at the compositor's trade should learn to use standard cases, composing sticks, and other tools, as well as standard types; he should not acquire his first lesson working with makeshift, "amateur" appliances and inferior material, or by inept, unworkmanlike methods. The same can be said concerning the apprentice pressman. Yet it does not necessarily follow that the newest idea in material or the latest improvement in a machine offer any superior advantage over an older, generally accepted material or machine. In any case study and practice with an "improvement" may be a serious limitation if one does not go further back to fundamental principles. All peculiarities or eccentricities in equipment should be avoided. A

vocational school for apprentices is no place to try experiments or introduce innovations.

While adequate equipment is necessary, avoid excessive equipment. Don't let the criticism of "over-equipped and under-taught" apply to your shop.

The sections on equipment and working conditions in the Instructor's Guides for the various units of the Standard Apprenticeship Courses are written in conformity with the principles expressed above.

2. Practice should be provided in essential and fundamental operations. The first concern should be that the apprentice should understand and master sound rudiments of the trade, and then that his instruction should be such as to enable him gradually to develop in his work any reforms and improvements which will prove of real advantage. Sound instruction should be stripped as much as possible of superfluities in order that the essential elements may be clearly seen and understood.

3. The student should be thoroughly prepared for his practice; in other words the particular skill that he is to practice should be properly presented to him by demonstration or otherwise, explaining all details and motions, and giving all necessary related information so that he will have a minimum of difficulty in performing it.

The converse of this principle is that students should not be permitted to undertake work for which they have not been properly prepared. In every class there are likely to be found one or more venturesome boys who will undertake tasks far in advance of their ability. They want to set up business letter-heads or other display forms, or print process color forms before they have mastered the fundamentals of either typesetting, display, or presswork. The instructor must be constantly alert to forestall any such attempts. He must at the same time avoid repressing ambition and initiative, which traits are to be encouraged.

4. Practice should be continued up to the point of maximum efficiency. See the discussion of this point in connection with laws of learning in Chapter III.

9. The Examination

The reliable printer, before delivering a job to a customer, will carefully inspect it to make sure that it contains no error in composition, no spoiled sheets, that the count is correct, and that it is satisfactory in every respect. The inspecting and checking-up process is just as important for the teacher of printing apprentices as for the job printer. It is necessary to make sure that the student can perform all the skills of the trade and that he can do all jobs according to trade standards of workmanship. The means of checking up the student's proficiency is, in school practice, called the examination.

The purpose of the examination may be threefold: First, it determines the student's proficiency as a basis of promotion. When he shows by test that he can satisfactorily perform the work of the group or unit, he is ready for the work of the next division. The examination given for this purpose is sometimes called a final examination.

Second, the test reveals weak points, the things that the student has not yet mastered and to which further study and practice should be given. Skilled instructors will give such tests at frequent intervals in order that students' deficiencies may be discovered and corrected, thus assuring a substantial foundation for the work of subsequent units. This is like proof-reading, getting press O. K., etc., at various points in the progress of the job instead of going through the whole thing to the end, then discovering errors in composition, make-up, etc., which require doing most of the job over.

A third purpose of the examination is to discover the cause of failure, whether it be due to lack of capacity or ability in the student, or to improper teaching conditions or methods. It is important that the reason for failure be conclusively ascertained and corrected as far as it is within the power of the instructor to do so. This purpose of the examination is distinct from, and even more serious than, the second purpose of detecting occasional weak points in the student. It is as necessary to check up and correct the

teaching conditions occasionally as it is to test out the student.

Three kinds of examinations may be used. For testing the informational or technical phases of the work, the oral examination or quiz may be employed. This is feasible as a time-saver where only one or two students are to be examined at a time. The written examination can be used with a large class as well as with a single individual. It is less personal and more thorough by permitting the student to write out the answers to the questions as completely as possible.

The kinds of questions used in written examinations deserve some consideration here. In the first place the character of the questions should be determined by the purpose of the examination, and the content of the answers sought should be within the subject matter which the student has covered. It is obviously unfair to expect a student to answer concerning something that he has not studied.

There are certain types of undesirable questions. Avoid double questions, also questions that can be answered by "yes" or "no." Trick or catch questions are unfair and will not be employed by a considerate teacher. Another type of undesirable question is the guess question to which there are but two possible answers, such as right or left, up or down, front or back, etc., so that a student stands an even chance of answering correctly by guessing or bluffing. Likewise undesirable is the question that permits of too great a variety of answers.

Questions should be specific, capable of being answered definitely and briefly without long explanatory answers. The rating of the answers is to be taken into consideration in making up the examination, and questions should be so formulated that the answer can be evaluated readily and justly. Sometimes a set of questions has definite values assigned for each, the total making one hundred points, thus placing the rating for the whole examination on a percentage basis.

For a test to discover deficiencies to which to give special attention, it is desirable to give questions touching on as wide range of points within the unit as possible; but for a final examination, thoroughness in a few points in an answer paper may be taken to mean that the student is equally competent in all topics of the unit. Therefore a few questions representing scattered phases of the subject may be given.

One objection to the written examination is that students may pass it by intensive study or "cramming" just preceding it. The answer to this objection is that the intensity thus exercised is a valuable exercise for the student, and in the heat of the process many facts are fused into his intelligence that he would not otherwise have mastered. The dread of students of the ordeal of the examination is another objection, but it should be remembered that the written examination is still the method largely used in the civil service and in many other places for testing the intellectual fitness of an applicant for preferment or promotion. Judiciously administered, there is still some justification, even in trade work, for written examinations.

The third kind of examination and the kind for which there is the most legitimate use in shop subjects, is the performance test. The great question that the world asks of every man is not, "How much do you know?" but, "What can you do?" Therefore the printing school should send out students with definite and proven ability to do certain kinds of work required in the printing industry. Acting upon this principle, the U. T. A. Department of Education has prepared for each unit in the Standard Apprenticeship Courses a performance test to be given the student when he has completed the work of the unit, and a grading schedule for determining his rating for the test. The performance tests are intended to be fair samples of what the student should do at the various stages of his work and as a result of the instruction provided in the lessons of the unit. The directions for conducting the test are given in the Instructor's Guide for the unit, which is not intended to reach the hands of students. However, students should understand

that this test is an inevitable close of each unit, and realization of this fact is calculated to spur them to greater diligence in the work of the unit. This test and its grading schedule are also intended to make it possible for the instructor to evaluate the student's proficiency in definite terms without uncertainty or guesswork. This topic is further discussed in Chapter VI, "Grading or Rating Students."

Questions

1. What are the abstract facts in printing that depend on sheer memory for recall?

2. Which of the teaching methods represent activity by the instructor, and which activity by the student?

References

Allen—The Instructor, the Man and the Job.
Strayer and Norsworthy—How to Teach.

CHAPTER V

THE LESSON

In Chapter II we said that the lessons were the steps by which the apprentice rises in his ascent toward the journeyman level and that these lessons were not arranged on the basis of time, but on the basis of teaching definite jobs or ideas. In the present chapter we will consider further the organization of the lesson. First of all, let it be understood that a lesson is not synonymous with a class session; it is a distinct teaching job, the basic working unit in learning, a "whole" of instruction, the new element to be learned, the definite step assigned to the student which is within his capacity to take successfully. Refer again to Figure 3 on page 10.

Characteristics of a Lesson

Every lesson has three distinct characteristics. First, it has an *aim or objective*, a definite point which the student is to attain. Usually this aim is implied in the lesson title, as "Using the Composing Stick," "Classifying Type Faces," or "Feeding Live Jobs." Sometimes it is desirable to amplify this aim or purpose or state it in other words in an introductory paragraph of the lesson. For example, in Lesson 1, Unit I, Group One, "Learning the Case," the first paragraph says:

> "It is our purpose in this lesson to learn something about the character of the printers' types and the means used by printers to keep these types in an orderly system so that they can be set up for use in the shortest possible time and returned to their place promptly when not in use."

When the student reads this statement, he knows just what he is expected to achieve in the lesson.

The second feature of the lesson is its *content or subject matter.* In a lesson carefully outlined, the divisions of the subject matter will represent the teaching points. For example, in the lesson already mentioned the teaching points are found in the section headings, as follows:

(1) What Types Are.
(2) Uniformity of Type.
(3) Face of Type.
(4) Parts of a Type.
(5) A Font of Type.
(6) Home of the Type.
(7) Learning the Case

The aim of the lesson and the teaching points must be specific and definite, reasonable in scope, and suited to the experience and intelligence of the apprentice. It should be borne in mind that the term "lesson" does not mean a period of time, but a series of related teaching points to be so treated that the aim of the lesson is accomplished. One lesson may take ten minutes and another ten hours.

Using again our illustration of the stairway, Figure 4, the aim or purpose of the lesson, that is, the new level that the student is to attain, may be represented by the vertical part of the stair which the carpenter calls the "riser." In a lesson this elevation is measured by teaching points, just as in building construction the riser is measured in inches.

The third characteristic of a lesson is its *procedure.* Just as a carpenter uses a standard trade method for constructing his stairs, so there is a recognized plan or course which the lesson should follow in order to be effective. There are usually three steps or stages in teaching a lesson or a point in a lesson. These are: (1) preparation, or getting the learner's mind ready to grasp easily the new idea; (2) presentation, or getting the new idea across to the mind of the learner; and (3) application, or fixing the idea in the learner's mind by his use of it.

Stages of the Lesson

The carpenter uses various tools in the several stages of his construction work on the stairway, and the teacher, likewise, in the different stages of the lesson will use the teaching tools or instruction devices (as described in the preceding chapter) best suited to the purpose. The science of pedagogy recognizes a number of distinct parts or steps that should be followed in a general way in the lesson organization and

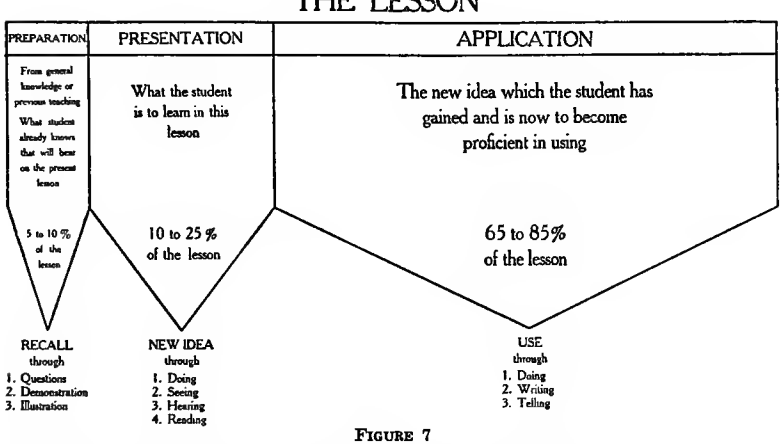

Figure 7

procedure. Among these parts or steps have been given the following: (1) preparation, (2) presentation, (3) application, (4) verification, (5) generalization. The latter two are subject to considerable difference of opinion as to interpretation and importance, but on the first three there is substantial agreement.

First Step — Preparation

In our discussion of the learning process in Chapter III, we saw that learning a new fact means that a new thought center in the brain is stimulated, and that this can occur only by the thought impulse reaching the new center by traversing as near to it as possible over thought tracts previously traveled, with a minimum distance to go finally

over an entirely new path. Therefore, any new thing learned must be approached through experience or knowledge that has already become a part of the mental equipment of the learner. The preparation step of the lesson, then, is recalling to the mind of the learner such of his knowledge and experience as may be related to the new thing to be taught. Former lessons or facts out of his general experience may be included. It is a focusing of what he already knows in a manner that will help him understand the new ideas about to be presented.

As the thought impulse travels from center to center in the brain, so the lesson theme progresses from point to point, or topic to topic. Each point may be a preparation for the next point, or a group of points may be preparatory to some later point. In the lesson above cited the first four points are necessary to understand the fifth point, this one is preparatory to the sixth point, and points five and six together are preparatory to the final point on learning the case. There must be laid in the mind of the learner an adequate foundation, not only for the lesson as a whole, but for each point in the lesson. For an elementary lesson, that is, the first lesson of any series which does not depend upon a preceding lesson, the preparatory foundation must be taken out of the student's general experience. In the lesson which we have used above as an example, the preparation consists in turning the student's attention to the invention of printing and its importance to the world. Surely any person who by age and education can qualify as a printer's apprentice knows something about this invention. The fact that he is now an apprentice at printing presumes a point of contact and an interest in the matter upon which to base the lesson.

The character or purpose of this lesson being to recall to the learner's mind previous experience or knowledge, the methods or teaching devices used for the step must be chosen accordingly. For recall of ideas, suggestion in some form is the natural principle of action. This may be accomplished through suggestive questions, suggestive illustration, or suggestive demonstration. In Lesson 1, "Learning the Case,"

the suggestion is effected through an impressive quotation emphasizing the importance of the art of printing which the apprentice is now about to learn, then in a brief paragraph his interest is focused upon the specific skill of the printing art which he is first to acquire—the character of the printer's types and means of keeping them in order.

The question and answer, or development method, is valuable in this step with classes of younger children in academic subjects, but may be greatly overdone with more mature students like printer's apprentices who possess such distinct interests and motives. While the preparation should be thorough in order to be effective, it does not mean that it should be too long or rambling. For the kind of lessons and students that we are considering, a few pointed questions or brief sentences will usually be sufficient at this stage.

Second Step — Presentation

With the student's attention directed out of the realm of his previous knowledge and interest to the specific new fact or skill which he is to acquire, the facts, principles, and performance of the lesson may now be presented. In this presentation the instructor should leave no means untried for getting the student to understand thoroughly all the "whys" as well as the "hows" of the lesson. For example, if the apprentice understands the reasons for justifying lines of type, he will perform the work more efficiently than if he were merely told to make the line full by inserting sufficient spaces. At the same time the presentation should be kept focused upon the point, and not allowed to digress to points or topics outside of, or only remotely related to, the lesson.

The methods or instruction devices to use for this stage will depend upon the character of the lesson. Possible methods are the lecture (oral or written), the demonstration, the illustration, and the experiment. It is usually well to present the point in various ways by using more than one method, *e.g.*, demonstration and lecture (or reading), experiment and illustration, or demonstration or illustration. The apprentice

may get the idea of the lay of the case from a diagram, by reading an explanation, and by examining the case.

Third Step — Application

The new fact or skill represented by the lesson must finally be acquired by the learner through his own efforts. In the preparation step he was brought from the responsive attitude to the receptive attitude necessary on his part for the successful presentation, but during these two stages the instructor did all the work. Now, too many instructors think that their teaching is completed when they have made their presentation. We cannot too strongly emphasize the fact that *mere telling or showing does not constitute teaching;* this is only a part of the teaching process. If teaching is helping a learner to learn, and the learning requires practical performance on the part of the learner, then the teacher's responsibility is not over until the learner has completed his performance and demonstrated by some kind of test or examination that he has acquired the proficiency in knowledge or skill which the lesson was intended to teach him. Moreover, the application step is a test of the effectiveness of the preceding steps. If the student is unable to perform satisfactorily the action prescribed, the presumption is that the preparation and presentation steps were not properly done by the instructor.

There are three ways of carrying out the step of application: (1) Have the apprentice do something that requires the use of the ideas presented in the previous step, and which he cannot perform unless he has grasped the idea (the method of practice on the job). (2) Have him write or tell about the idea (the method of oral or written examination). (3) Question him about it. The first way is the best whenever it is possible and practicable. The second and third methods may become mere memory tests. An apprentice may be able to make a perfect diagram of the case, but if he cannot select type from it promptly and accurately, his knowledge of the case is of little use. The major part of the time spent on a lesson should be given to this step. Figure 7 illustrates the character and use of the different parts of the lesson.

A Lesson Analyzed

To illustrate the idea set forth above, we will develop the lesson on Make-Ready for Wood-Base Electrotypes for Platen Press. (Group Seven, Unit II, Lesson 6.)

The teaching points in this lesson are:

(a) A wood-base electro is made up of a metal plate mounted on a wooden base.

(b) Irregularities of surface result from swelling or warping of the wood.

(c) A weak impression by any part of an electro is due to that part being lower than the rest of the plate.

(d) The way to make the impression even is by raising the low part of the plate.

(e) The plate may be raised by underlaying.

(f) How to underlay.

The following outline shows how the lesson is constructed, and the methods suggested for teaching each step and each point. You should try constructing lessons until able to prepare them readily.

Group Seven—Platen Press.

Unit II—Press Preparation.

Lesson 6—Make-Ready for Wood-Base Electrotypes.

Aim—To teach student to make-ready a wood-base electro for the platen press.

Step 1 — Preparation

Method	
	1. Student is able to make-ready type.
Question and Answer	2. Since the new thing to be taught in connection with make-ready of wood-base electros is largely a matter of underlay, a recall of the method of leveling the tympan by spotting up is the natural approach to the new matter in this lesson.

STEP 2 — PRESENTATION

Demonstration or Students Doing	1. Put on the press an electro with low corner and take enough impressions to furnish one to each student.
Question and Answer	2. Develop the fact that the part of the impression which is weak is due to a different cause than the weak impression made by a type form, and that a different remedy must be applied.
Demonstration	3. Bring out the fact that the electro is made up of plate and base, and why.
Observation and Questioning	4. Bring out the cause of irregularity of electro due to swelling or warping of wood.
Question and Answer	5. Bring out the idea that building up may be on the back of the base (underlay) as well as on the tympan.
Doing Question and Answer	6. Have student mark out on a trial sheet the area to be raised and develop the fact that the extreme corner needs to be raised most and the inner edge of the area least.
Question and Answer	7. Develop the idea that successive layers of paper, covering varying areas, will raise the printing area correspondingly.
Reading, Telling Demonstration Illustration	8. Have students get some idea of the way in which electrotypes are made.

STEP 3 — APPLICATION

Doing and Telling, or Question and Answer	1. Have student underlay electro with low corner. Caution him to use too little rather than too much underlay.

Doing	2. Have student try electro on press and gradually increase underlay as necessary.
Doing	3. Repeat with electro that is low in center.
Doing	4. Have student make ready a wood-base electro for press run.
Question or Demonstration	5. Bring in here possibility of planing base and making uniform underlay.
Question Demonstration	6. Is underlay practical with electro low in center?

Questions.

1. What is the purpose or aim of each of the "steps" in a lesson? ALLEN, Chap. XVIII to XXIX.

2. What are the best methods to use in each of the "steps"? ALLEN, Chap. XXIII to XXVI.

3. What are the two methods of approach in handling a lesson? ALLEN, Chap. XXVII.

4. What are the steps to be taken in planning a lesson? ALLEN, Chap. XXIX and XXX.

5. What are the major differences between a technical lesson and a production lesson? ALLEN, Chap. XXVIII.

6. Explain each of the three steps of a lesson in terms of the laws of learning in Chapter III. STRAYER AND NORSWORTHY, Chap. XIII.

7. In each of the lessons in Unit I, determine the preparation step, also the statement of the purpose of the lesson.

References

Practical Apprenticeship for Printers, Part IV.
ALLEN—The Instructor, the Man and the Job, Part V.
STRAYER AND NORSWORTHY—How to Teach.

CHAPTER VI

GETTING STUDENTS' INTEREST

The problem of stimulating interest is based upon the original nature of the student. In organizing teaching material for the purpose of securing from the students certain desired responses in performance and trade practice, the instructor must comprehend something of the fundamental instincts and motives which govern human behavior. Every normal man possesses certain deep-seated tendencies and capacities which determine his response to various situations. Some of these which are directly related to the matter of the students' interest, and to which the teacher should therefore seek to appeal, are here mentioned.

Interest Factors

One of the most important interest factors is *the propensity for activity*. Every man and, more particularly, every boy loves to handle things. The new apprentice if unrestrained will invariably go about the shop handling various objects, pulling levers, and turning the wheels of any machine available. He also wants to be moving rather than sitting still, and likes to see the accumulating results of his activity either in lines of type or stacks of printed sheets. This universal tendency is one of the foundation stones of the boy's nature upon which to build trade skill, and the instructor should utilize it in planning his teaching program. If the boy loves to handle things, then just as promptly as possible give him an exercise to perform which will involve manipulation. With a minimum of theory and explanation, let him begin to use the composing stick or feed the press. A simple job will satisfy the propensity and at the same time provide him with experience from which through later reflection to draw out the underlying theory or the "why" of his action.

Nature has ordained that we shall "learn to do by doing." Futhermore, the busy student is the happy and contented student.

Another interest factor is *realization of the value of one's effort.* If the student is aware of the ultimate advantage to him of his exertions, he will work more diligently than when such feeling is not present. The printer's apprentice has the great life-career motive of desiring to learn the trade; therefore he wants to feel that every job or lesson that he performs is of direct benefit to him in attaining that end, and that it sets him measurably forward toward the goal of his ambition to become a journeyman printer. If the job contains no new learning factors, if it is a production assignment which he has already learned to perform, from which he realizes no new increment of skill or trade knowledge, and for which he receives no compensation, monetary or otherwise, he cannot be expected to display much interest in the task, and he will sooner or later resent the exploitation. This obeys the law of effect discussed in Chapter III. Therefore, each job assigned to the apprentice should be one that will yield to him some definite trade value which he will readily recognize. This is why at the beginning of each lesson the specific objective should be stated, either implied in the lesson title or given in the introductory sentence.

The third important interest factor is *self-confidence.* The student must feel that he can do the job. The assignment should therefore be within his ability to perform by reason of his previous experience. The new learning difficulties of any job should not be too numerous or too far advanced. The assignment should also be presented in a manner that the student can understand. To give an apprentice a job too difficult for his stage of advancement or with indefinite instructions, is to foredoom him to failure, with its inevitable discouragement and loss of interest. On the other hand, the enthusiasm, the satisfaction, and the joy of achievement that come to him from successfully completing the job, give still greater confidence for attempting a more difficult job the next time.

Closely allied to self-confidence is *pride in good workmanship*. We find greater enjoyment in doing the things that we do well. Hence the importance of having apprentices learn thoroughly whatever they undertake. Haste at the expense of thoroughness is sure disaster in the long run. A *good* job is more to be desired than a quick job. The enjoyment of good work is the secret, soul-gratifying compensation of the artist and the underlying spirit of true craftsmanship.

In this connection the instructor should be aware of the opposing characteristic of human nature, namely, the tendency to minimum effort. We do not raise our work to a higher standard than is required of us. This means that students are not likely to do work of much better grade than the instructor demands. If they do poor, slovenly work, it is because he accepts it. On the other hand, it is surprising what degree of excellence can be attained by a class whose instructor exemplifies and insists upon a high standard of workmanship. Admiration of excellence is, indeed, an instinctive trait of mankind. The student therefore respects the instructor who holds him to a high standard, while he naturally discounts the boss who is lax in workmanship. Remember that the quality of workmanship of the student always reflects the standard of the teacher.

Rivalry and competition are instinctive and powerful human motives which the instructor should utilize as interest factors. We do not want to be outdone by the other fellow; we will exert ourselves to the utmost to keep up with him and to surpass him if possible. In order to do this it is necessary to know definitely his state of progress, just what point he has reached. This factor, of course, enters into group work with a class where the work and progress of each student is openly revealed to all. It is a less potent incentive where only a single apprentice is working without the stimulus of rivalry with others.

The desire for approbation is another primary instinct which becomes an important interest factor. When the apprentice receives the approval of his foreman for a job well done, with what enthusiasm he will attack the next job! A

word of commendation costs nothing to give but yields marvelous results in increased interest and effort. Closely akin to the desire for approval is the satisfaction always experienced by the student or apprentice from kind expressions of sympathy and helpfulness. When he feels that his "boss," whether instructor or foreman, is interested in him and trying to help him, his interest is greatly quickened. The attitude of instructor toward students should always be stimulating and encouraging.

Getting attention of others is a propensity that is more or less active in all normal human beings. Whether in approval or in scorn, we insist on being noticed by our fellows. No matter how shy or modest he may be, no man can stand to be ignored. He wants his fellows to know certain things about him. This inclination when combined with the faculty for loyalty to some worthy object or agency, is gratified by such devices as wearing insignia of various kinds. For this reason the U. T. A. apprentice buttons will have a meaning all over the printing world. The youth wearing this button secures the attention of every person he meets, and silently proclaims that he is an apprentice in a Typothetae shop in which he has served at least six months.* The desire for approbation and attention of others is the basis of the motives to which instructors appeal in the use of rewards, posting honor rolls, and other devices to stimulate the interest of students.

The Progress Chart

One of the most successful devices yet produced for stimulating interest in shop work classes is the student's progress chart which shows in graphic form the achievement of each student. It should be of large size (not less than three feet wide, two feet high) and on strong paper. It should be posted in a conspicuous place in the shop where it is accessible to any student, so that he can at any time note his progress with reference to the whole course and compare his accomplishment with that of other students. This chart is especially well adapted for use with the Standard Apprenticeship

*See Practical Apprenticeship for Printers, pp. 74, 75.

Courses for Printers, as will be seen from the illustration in Figure 8.

The posting up of the chart is a simple matter. Whenever the student completes a unit the instructor makes an entry in the square opposite his name and in the proper unit column. The following are some methods used by various instructors for making this entry:

1. The space is filled in solid with a stamp, a colored pencil, or colored ink. Bright colors are preferable. The succession of spaces thus filled in eventually forms a bar graph.

2. The space is marked with a cross (X) preferably in color. A stamped mark may be used.

3. The outline of the space is drawn with colored pencil, leaving the inner area for noting date and rating.

Whenever the space is registered or filled in, it indicates that the student has completed that unit.

The specific advantages of this chart are:

1. It is a class record that can be kept up with a minimum of clerical labor by the instructor.

2. The record is public and readily intelligible by all—fellow students, parents, employers, school officials, or anybody interested.

3. It shows at a glance just how much has been accomplished by each student and how much still remains to be done to complete his course.

4. The student will work more zealously to complete the course unit by unit because the attainment of the unit is a near-by objective and thus more stimulating to effort than the more remote end of the complete course, and he is anxious to see the unit spaces of the chart filled in one by one.

5. It provokes rivalry because each student can compare his progress with that of others. If he is ambitious he will endeavor to outdo the others. Even if he is lacking in ambition, he will be more likely to make an effort to keep up rather than suffer the humiliation of being a laggard or bear the scorn and teasing of his classmates.

THE PROGRESS CHART

Student's Name	Group One Elements of Composition					Group Two Book Composition				Group Eleven Am. S. & I. History				Group Twelve English for Printers				
	Principles of Typesetting	Proving Composition	Distribution	Style Aids in Composition	Calculation in Composition	Plain Book Composition	Special Book Features	Tabular Work	Special Classes of Books	Human and Industrial Relations	Making of the United States	Development of the United States	Economics of the Printing Industry	Dictionary	Grammar	Punctuation	Composition and Letter Writing	Proof-Reading
Anderson, John.....	*	*	*	*	*					*	*	*		*	*			
Austin, James.....	*	*	*							*	*	*		*	*			
Brown, Peter.....	*	*	*							*	*	*		*	*			

FIGURE 8

THE CREDIT CERTIFICATE

Besides having his progress recorded on the chart or in the official record of the school, the student also desires from time to time some credential that he may keep and display in other places. This may be effected by means of a credit certificate to be filled out upon the completion of the unit and given him at the same time that the entry is made on the chart. This is equivalent to a pay check issued on a piece-work basis. Most students or apprentices will highly prize these certificates, and with great pride will exhibit them to parents or friends. The certificate also furnishes the student with concrete evidence of his attainment

which he can produce whenever it may be desirable to do so. Such certificates will be especially valuable in case of a student changing schools or an apprentice changing shops before the completion of the course. The credit certificates should be accepted at their face value, whenever presented, because they record the completion of specific units of work which should be approximately alike in any school or shop using the U. T. A. Standard Apprenticeship Courses. In the new school or shop, if these courses are used, the apprentice may take up other units and in the end receive the same instruction, no matter if, by reason of personal circumstances, he has been in two or more schools or shops during his apprentice career. Of course, the number of actual cases of this kind will be relatively few.

Questions and Problems

1. How does the law of readiness apply to the matter of the student's interest?
2. Explain the difference between securing attention and directing attention.
3. What is the difference between interest and attention?
4. From your observation give examples of free attention and forced attention.
5. Which form of attention, free or forced, is more common with apprentices in printing?
6. What bearing does the subject of human instincts have upon the interest of students in printing classes?
7. List out as many as you can of the various devices which you have observed for stimulating interest.

References

Strayer and Norsworthy—How to Teach, Chap. III.
Allen—The Instructor, the Man, and the Job, Chap. XXXVI, XXXVII.
Tead—Instincts in Industry. Houghton Mifflin Co., Boston, $2.00.

CHAPTER VII

GRADING OR RATING STUDENTS

It is necessary for instructors to check up periodically the progress of students and to inform parents or employers of this progress. It is furthermore desirable in this checking-up to evaluate the student's ability or relative worth. In most schools there is some system used for rating students. In Appendix B are shown specimens of rating schemes used in some of the most progressive schools of printing. There is, however, a feeling on the part of all printing school directors as well as thoughtful foremen having charge of apprentices, that much is still to be desired in the matter of rating schemes.

Rating Schemes

The commonly used systems of marks in school work generally will not answer for use in rating apprentices. Blanket grades expressed in such terms as percentage, A—B—C—D—E, excellent—good—fair—poor—failure, satisfactory—unsatisfactory, etc., are vague and indefinate and lack sufficient detail to be specific. Likwise unsuitable are the ordinary methods of arriving at the rating—the snap judgment method with its guess work and susceptibility to personal feeling, or the comparative method of giving the best student the highest mark, the poorest a suitably low mark, and rating the others relatively between these marks. More feasible than either of these is the score card method of listing out the essential qualities or characteristics of the work as rating factors and assigning to each factor a value.

Rating Factors

The rating factors should be the fundamental skills, qualities, or characteristics which actually function in the unit of work for which the individual is being rated. Among the qualities suggested as entering into various branches of the printing trade are:

1. Accuracy.
2. Ambition.
3. Aptitude
4. Artistic Ability.
5. Attendance.
6. Attitude.
7. Care of Tools and Materials.
8. Initiative.
9. Interest.
10. Judgment.
11. Neatness and Order.
12. Originality.
13. Posture.
14. Punctuality.
15. Self-Direction.
16. Self-Reliance.
17. Speed or Time.
18. Workmanship.

In developing a rating scheme for any unit, first determine which qualities actually enter into the unit. For example, in Group Seven, Unit I, Job Press Feeding, all persons will probably agree that neatness and order, care of tools and material, accuracy, speed, and aptitude would be important factors, while there would be little or no demand for artistic ability or originality, although these would be important factors in other units. The qualities that do not enter into the performance of the unit should not be considered.

Having selected the rating factors, it is next necessary to evaluate each one. A simple and feasible scheme for establishing the rating is to make the sum of the maximum points for all factors equal 100. The value of the several factors is then apportioned according to their relative importance. For Job Press Unit I, referred to above, this evaluation might be made as follows:

Speed	20 points
Accuracy	30 points
Neatness and Order	15 points
Care of Tools and Material	15 points
Attitude	10 points
Workmanship	10 points
Total	100 points

The rating of the student or apprentice is then determined by considering how many of the maximum number of points on each quality he actually deserves.

This method has the virtue over the blanket method arrived at by snap judgment, of breaking up the single judgment with its chance of error, into several judgments, each with its possiblity of error, but with the probability of these errors offsetting each other; that is, if the rating be too severe on one factor, it may be too generous on another, so that the final rating is more likely to be just and fair. This method also discloses weak points, and a wise instructor will direct the student's efforts toward the improving of these deficiencies when they have been discovered.

The Measuring Scale

The score card method, however, is only a step in the right direction. It should be developed into a more accurate measuring scale by analyzing out each factor into carefully graded degrees by which it is possible to determine just what stage of proficiency in the factor the student has attained. Each degree is given a value in points, and the sum of all points allowed makes the total rating.

The grading schedule used for Unit I of Group One, Elements of Composition, given on the following page, will show how the comparative scale is arranged.

From this schedule the rating for the factor of *speed* can easily be determined by counting the number of lines set in a test, and *accuracy* by the average number of proof errors per line. For the factors of *neatness, workmanship, attitude,*

Grading Schedule

RATING FACTORS	F	E	D	C	B	A
Spaad Based on composition of straight matter, 10-point, 20 picas wide.	4 lines per hour Inert 5 points	6 lines per hour Slack 6 points	8 lines per hour Dilatory 7 points	10 lines per hour Moderate 8 points	12 lines per hour Rapid 9 points	14 lines per hour Swift 10 points
Accuracy Based on average number of proof mark mistakes per line.	5 mistakes per line 13 points	4 mistakes per line 15 points	3 mistakes per line 17 points	2 mistakes per line 20 points	1 mistake per line 23 points	No mistakes 25 points
Neatness and Order Based on care of material, etc.	Slovenly and Smeary 10 points	Negligent 12 points	Cursory 14 points	Clean 16 points	Tidy 18 points	Immaculate 20 points
Workmanship Based on justification spacing, handling types, etc.	Awkward 10 points	Crude 12 points	Coarse 14 points	Fair 16 points	Dexterous 18 points	Expert 20 points
Attitude The student's mental reaction toward his work.	Indifferent 5 points	Perfunctory 8 points	Passive 9 points	Interested 10 points	Eager 11 points	Enthusiastic 12 points
Aptitude The native tendency of the individual to acquire skill in this line of work.	Stupid 6 points	Bungling 7 points	Clumsy 9 points	Handy 10 points	Capable 11 points	Adept 13 points

and *aptitude*, determine in the comparative scale the term best describing the student and his work at the completion of the unit, and allow him the rating indicated by that term. The sum of the points allowed on all factors will be the grade given. The sum of all points in the lowest (F) column is 50 and in the highest (A) column is 100. If the student falls below the degree specified in the C column on any factor, he should be required to repeat the work of the unit until he can measure up to this standard.

It will be noted that for each factor the schedule gives three degrees below the minimum grade to be accepted. This is desirable in order to make a just and careful evaluation and description of the qualities in which a student may prove deficient.

Let us explain the use of the grading schedule by a concrete case. Harry Barrows in his test sets twelve lines (9 points), and the total number of proof errors is 27 (2+ per line, 20 points). In neatness he may be described "clean" (16 points), in workmanship "fair" (16 points), in attitude "eager" (11 points), and aptitude "handy" (10 points). His grade is then made up thus:

Speed	9 points
Accuracy	20 points
Neatness	16 points
Workmanship	16 points
Attitude	11 points
Aptitude	10 points
Total Grade	82 points

Apprentice and Journeyman Standards

Here the question may be raised as to what extent journeyman standards should prevail in rating apprentices, especially in the beginning of the course. Is it reasonable to expect of a student of a few weeks of experience a speed equal to that of the journeyman? Obviously not. If the journeyman speed per hour for setting ten-point is 800 ems, and the student can set 240 ems, should his rating be $^{240}/_{800}$ or 30 per cent? Such a low rating would discourage him; nor would it be readily understood by his parents and friends, who are used to the school "passing mark" of 75 per cent, and expect him to come well above this point. Would it not be more fair and more likely to encourage him if he were compared with the normal attainment of the average student of the same experience? That is, if the *average* second-year apprentice can set a certain job in six hours, all second-year apprentices who set this job in six hours should be rated satisfactory on the *apprentice* basis, regardless of the journeyman standard.

There is no objection—in fact, it is quite desirable—to let the apprentice understand how the basis upon which he is rated compares with the journeyman standard. The latter

might be printed on the credit certificate for the unit so that the degree of journeyman proficiency is apparent.

This means that each division or unit should have its own peculiar rating schedule, based upon the factors entering into it and upon the normal performance of all apprentices or students for these factors.

Standard Rating Schedules

The determination of normal standards of proficiency for the various units of the Standard Apprenticeship Courses for Printers is one of the problems which the U. T. A. Department of Education proposes to attempt, and in the undertaking invites the co-operation of all instructors using these courses. The working out of such a problem will involve much careful experiment, reporting of results, tabulation, and computation. It is to be understood that the rating schedules proposed in the Instructors' Guides for the various courses (similar to the schedule discussed above for Unit I of Group One) are only tentative. The standards, quantities, and terms describing the several degrees of the various rating factors as well as the terms describing the factors themselves, are at first set up merely as range finders, since it is desirable to have something upon which to concentrate attention, some method that will be uniform in making the trials, and that will make possible reports and recommendations from various instructors which can be interpreted in the same terms. The composite of such reports and recommendations will eventually develop rating schedules that may be regarded as standard.

The U. T. A. Department of Education believes that the general principles governing the proposed system of rating schedules conforms with the latest practice in using trade tests and educational measurements, namely:

1. It identifies the fundamental skills or characteristics to be used as rating factors.
2. It adopts the *normal* achievement in these factors by individuals of given classes or groups, based upon

maturity, previous experience or training, etc., as the standard by which to measure and rate the progress of students at any given point.

Questions

1. What are your reasons for grading students?

2. What are the objections to the "snap-judgment" method of rating? To the "blanket" method?

3. What are the advantages of the measuring scale method in determining ratings of students?

4. Should students be informed of the basis upon which they are rated? Why?

5. What is the relative importance of personality factors, knowledge factors, and performance factors in rating students?

6. To what extent should an apprentice be rated by journeyman standards?

7. In what respects would the rating differ in determining for a given skill the proficiency of a stranger (*e. g.*, an applicant for a job, and a student who has learned the skill under the direction of the instructor making the rating)?

8. Of what significance are the dispositions, aptitudes, habits, etc., that determine success in life, in rating apprentices in printing?

References

Practical Apprenticeship for Printers, Part IX.

Strayer and Norsworthy—How to Teach, Chap. XV.

Link—Employment Psychology.

Hollingsworth—Vocational Psychology.

APPENDIX A

Courses of Instruction Recommended for Various Printing Trades

	Hand Compositor	Platen Pressman	Cylinder Pressman	Linotype Machinist Linotype Operator	Monotype Combination
SHOP PRACTICE Required	Group One: Elements of Composition Two: Book Composition Three: Display Composition Four: Ad. Composition Five: Job Composition Six: Stone Work	Group Seven: Job Press Seventeen: Power	Group Eight: Cylinder Press Seventeen: Power	Group One: Elements of Composition Two: Book Composition Three: Display Composition Four: Ad. Composition Nine: Linotype Seventeen: Power	Group One: Elements of Composition Two: Book Composition Three: Display Composition Four: Ad. Composition Ten: Monotypa Seventeen: Power
SHOP PRACTICE Optional	Sixteen: Shop Routine Seven: Job Press	Sixteen: Shop Routine Fifteen: Pamphlet Binding Six: Stone Work	Sixteen: Shop Routine Fifteen: Pamphlet Binding Six: Stone Work	Sixteen: Shop Routine Five: Job Composition	Sixteen: Shop Routine Five: Job Composition
RELATED STUDIES	Eleven: Am. S. & I. History Twelve: English for Printers Thirteen: Printers' Arithmetic Fourteen: Design for Printers Eighteen: Health and Safety	Eleven: Am. S. & I. History Eighteen: Health and Safety Thirteen: Printers' Arithmetic	Eleven: Am. S. & I. History Eighteen: Health and Safety Thirteen: Printers' Arithmetic	Eleven: Am. S. & I. History Twelve: English for Printers Thirteen: Printers' Arithmetic Fourteen: Design for Printers Eighteen: Health and Safety	Eleven: Am. S. & I. History Twelve: English for Printers Thirteen: Printers' Arithmetic Fourteen: Design for Printers Eighteen: Health and Safety

APPENDIX B

Specimens of Printing School Records

U.T.A. SCHOOL OF PRINTING
INDIANAPOLIS

Record of _____ for Month of _____ 19__

Course _____ Dept. _____ Instructor _____

Special _____

VG—Very Good. G—Good. F—Fair. P—Poor. Un.—Unsatisfactory

Hours Required _____ Hours Present _____

WEEKS	FIRST WEEK					SECOND WEEK					THIRD WEEK					FOURTH WEEK					FIFTH WEEK					Average	Instructor
DAYS	M	T	W	T	F	M	T	W	T	F	M	T	W	T	F	M	T	W	T	F	M	T	W	T	F		
Attendance—Hours																											
Punctuality																											
Interest and Attitude																											
Workmanship																											
Care of Tools and Equipment																											
Speed																											
Initiative and Judgment																											
Artistic Ability																											

(FACE)

Work Covered During Month

_____

_____

_____

_____

_____

_____

_____

_____

Instructor's Recommendations

_____

_____

_____

_____

_____

_____

_____

_____

(BACK)

The Lakeside Press
R. R. DONNELLEY & SONS CO.
THE SCHOOL FOR APPRENTICES

PRE-APPRENTICE SHOP REPORT

Name_____ Address_____

Dept._____ Month ending_____ 192__ Work_____

1. Is he prompt?
2. Does he finish what he begins?
3. Has he energy in going ahead with work?
4. Does he work well without supervision?
5. Does he get along well with others?
6. Is he neat in his work?
7. Is he improving?
8. Has he any serious faults? Specify
9. Has he any bad habits? Specify?

Efficiency (Shopwork)_____
Explanation—95-100, Standard; 85-94, Good; Under 85, Failure

_____ Overseer _____ Supervisor

_____ Foreman _____ Parent

To the Parent or Guardian: This report is the opinion of the men who are actually in charge of your son during the hours he is at work. Study it carefully

The Lakeside Press
R. R. DONNELLEY & SONS CO.
THE SCHOOL FOR APPRENTICES

PRE-APPRENTICE RECORD

Name_____ Began_____

Address_____ Telephone_____

Born_____ Graduated from_____ 192__

192__ Month of	Rate Per Week	Overtime and Bonus	Total for Month	No. of Days Attended	Times Late	Work in Plant	EFFICIENCY				Average	Remarks
							Academic	Trade	Factory	Conduct		
July												
Aug.												
Sept.												
Oct.												
Nov.												
Dec.												
Jan.												
Feb.												
Mar.												
Apr.												
May												
June												
Total												

Explanation: The letter and the number indicate the department and the work; as, A Composing-room, 373 Errands. A373 Composing-room Errands.

All standings are based upon the quality and the quantity of work done. Time-limits are set on each job or assigned task according to past experience. If the jobs are performed within the time-limits set, and the quality of the work is up to the standard of the department, a credit of 100 is given, which means *satisfactory* work both as to quality and quantity. The quality *must* be standard, hence the standing becomes largely a *time-basis* record. Above 100 indicates *excellent* work,—standard quality in less than the time-limit set. Ninety-five is the *lowest standard*. Ninety indicates *fair* work; eighty-five or less, *failure*. Standings less than 100 indicate that more than the time-limit was taken to perform the job. In determining the average performance, the standings have the following values:

	Standing	Relative Value	Total Value
Trade	90	3	270
Academic	95	3	285
Factory	95	2	190
Conduct	100	2	200
Total		10	945 Average

Signature of Parent or Guardian:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____

The Lakeside Press
R. R. DONNELLEY & SONS CO
THE SCHOOL FOR APPRENTICES

APPRENTICE YEARLY RECORD

Name _____ Began _____ Date _____

Address _____ Telephone _____

Born _____ Graduated from _____

Three Mos	Weekly Pay	Overtime and Bonus	Total for Quarter	Days Attended	Times Late	Work in Plant	EFFICIENCY Academic	EFFICIENCY Trade	Remarks
July - Sept									
Oct. - Dec									
Jan. - Mar									
April - June									

Shop Report	July - Sept.	Oct - Dec.	Jan. - Mar.	Apr. - June	Remarks
1 Is he prompt?					
2 Is he careful with tools and machinery, and of materials?					
3 Does he apply himself to a job until it is completed?					
4 Is he adapted to and prepared for the work he is doing?					
5 Does he work well without supervision?					
6 Does he work for results?					
7 Has he energy in going ahead and doing things?					
8. Has he ability to meet emergencies?					
9 Does he get along well with others?					
10. Is he improving?					
11 Has he any serious faults? ____Specify____					
12. Has he any bad habits? ____Specify____					

Explanation—95-100, standard; 85-94, good; under 85, failure

To the Parent or Guardian: Careful study of this report, by yourself with the apprentice, will indicate to you the points upon which your son, or ward, needs to strengthen himself in order to reach a higher efficiency. The object of the report is to secure the co-operation of parents, instructors, overseers, and foremen, in order to secure a high degree of efficiency in the Apprentice School.

_____ Foreman

_____ Overseer

_____ Supervisor

July - September _____ Parent or Guardian

October - December _____ Parent or Guardian

January - March _____ Parent or Guardian

April - June _____ Parent or Guardian

Parent or Guardian will sign and return

APPENDIX C

OUTLINE OF STANDARD APPRENTICESHIP LESSONS FOR PRINTERS

GROUP ONE

ELEMENTS OF COMPOSITION

UNIT I. PRINCIPLES OF TYPESETTING

1. Learning the Case
2. Using the Composing Stick
3. Justification
4. Spacing
5. Setting Various Measures

UNIT II. PROVING COMPOSITION

1. Tying Up
2. Taking Planer Proofs
3. Marking Proof Errors
4. Correcting Errors
5. Using Proof Presses

UNIT III. DISTRIBUTION

1. Cleaning and Caring for Type
2. Distributing Type
3. Caring for Materials

UNIT IV. STYLE AIDS IN COMPOSITION

1. Caps and Small Caps
2. Punctuation—Period and Comma
3. Punctuation—Continued
4. Punctuation—Continued
5. Using Italics
6. Representing Number
7. Division of Words
8. Indention
9. Setting Poetry

UNIT V. CALCULATION IN COMPOSITION

1. The Point System
2. Leader and Figure Work
3. Multiple Justification

GROUP TWO

BOOK COMPOSITION

UNIT I. PLAIN BOOK COMPOSITION

1. Extracts and Notes
2. Initial Letters
3. Headings and Sub-Headings
4. Make-Up
5. Cover and Title Pages
6. Setting Around Illustrations

UNIT II. SPECIAL BOOK FEATURES

1. Copyright and Imprint
2. Dedication
3. Half Titles
4. Table of Contents
5. Preface and Introduction
6. Index
7. Make-Up Materials
8. Illustrations and Tables
9. Proving and Storing

UNIT III. TABULAR WORK

1. Tables without Rules
2. Tables with Rules
3. Tables with Box Headings
4. Tables for Ruled Sheets
5. Time Tables
6. Tariff Tables

UNIT IV. SPECIAL CLASSES OF BOOKS

1. Legal Briefs
2. Technical Books
3. Books in Foreign Languages
4. Periodical Magazines
5. House Organs

GROUP THREE

DISPLAY COMPOSITION

UNIT I. SELECTION OF TYPE, BORDERS, AND ORNAMENTS

1. Classifying Type Faces
2. Type Families and Series
3. Expressing Thought with Type
4. Using Printers' Rules
5. Borders and Ornaments

UNIT II. PRINCIPLES OF DISPLAY
1. Interpreting the Copy
2. Contrast
3. Harmony
4. Proportion
5. Balance
6. Spacing

UNIT III. USING SKETCHES AND LAYOUT
1. Preliminary Sketches
2. Working to a Layout
3. Determining Type Sizes and Measures
4. Marking up Copy

GROUP FOUR

ADVERTISING COMPOSITION

UNIT I. ANALYSIS OF COPY
1. Atmosphere
2. Salient Points
3. Subordinate Information

UNIT II. NEWSPAPER ADVERTISEMENTS
1. Measures and Dimensions
2. Featuring Prices
3. Methods of Composition
4. Single and Multiple Column Advertisements
5. Department Store Advertisements

UNIT III. PERIODICAL AND MAGAZINE ADVERTISEMENTS
1. Possibilities and Limitations
2. Placing Illustrations
3. Harmonizing Type with Illustrations
4. Mail Order Advertisements

UNIT IV. LAYOUTS AND SPECIFICATIONS
1. Preliminary Sketches
2. Working to Layout
3. Determining Type Sizes and Measures
4. Marking up Copy

GROUP FIVE

JOB COMPOSITION

UNIT I. BUSINESS STATIONERY
1. Business Cards
2. Letter-Heads
3. Envelopes
4. Billheads and Statements

UNIT II. SMALL COMMERCIAL FORMS

1. Receipts
2. Banking Forms
3. Rule Forms
4. Shipping Tags and Labels

UNIT III. PUBLICITY FORMS

1. Handbills
2. Blotters
3. Tickets
4. Envelope Enclosures
5. Announcements
6. Window Cards and Posters
7. Two-Color Forms

UNIT IV. SOCIAL FORMS

1. Cards
2. Personal Stationery
3. Announcements
4. Wedding Invitations
5. Holiday Printing

UNIT V. CHURCH PRINTING

1. Stationery
2. Announcements
3. Church Programs
4. Booklets

UNIT VI. BOOKLETS AND FOLDERS

1. Connection with Book Printing
2. Cover Pages
3. Text pages
4. Folios
5. Four-Page Programs
6. Menus
7. Special Fold and Arrangement

UNIT VII. CATALOGS

1. Catalog Covers
2. Title Pages
3. Introductory Matter
4. Typographical Salesmanship
5. Placing of Illustrations
6. Tabular Matter in Catalog Pages
7. Make-Up of Pages
8. Copy Fitting

GROUP SIX

STONE WORK

UNIT I. ELEMENTS OF LOCKUP

1. Lockup Equipment
2. Principles of Lockup
3. Making Proofs and Corrections
4. Locking up Small Forms
5. Locking up Rule Forms
6. Registering Color Forms
7. Locking up for Foundry

UNIT II. IMPOSITION

1. Four-Page Forms
2. Eight-Page Forms
3. Twelve-Page Forms
4. Sixteen-Page Forms
5. Twenty-four-Page Forms
6. Thirty-two-Page Forms

GROUP SEVEN

PLATEN PRESS

UNIT I. PLATEN PRESS FEEDING

1. Getting Acquainted with the Press
2. Oiling and Cleaning
3. Feeding Blank Stock
4. Feeding Live Jobs
5. Washing the Press

UNIT II. PRESS PREPARATION

1. Preparing the Tympan
2. Inking-Up
3. Placing the Form
4. Getting Uniform Impression
5. Press O. K.
6. Make-Ready for Wood-Base Electrotypes
7. Make-Ready for Mixed Form
8. Make-Ready for Rule Form

UNIT III. PRESS ROLLERS

1. Composition
2. Care and Seasoning
3. Adjustment

UNIT IV. PAPER
1. Grades of Paper
2. Trade Sizes and Designation
3. Handling Paper
4. Caring for Paper Stock
5. Cutting Stock

UNIT V. PRINTING INK
1. Qualities of Ink
2. Ink on Paper
3. Composition of Ink

UNIT VI. PRESS ADJUSTMENT AND MECHANISM
1. Platen Adjustments
2. Press Motions
3. Inking System

UNIT VII. HALF-TONE MAKE-READY
1. Square Half-Tone
2. Vignette
3. Process Color
4. Tint Block
5. Ink Distribution

UNIT VIII. SPECIAL PRESS OPERATIONS
1. Perforating
2. Scoring
3. Die Cutting
4. Numbering
5. Embossing
6. Bronzing

UNIT IX. THE MILLER AUTOMATIC FEEDER
1. Principles of Construction and Operation
2. Setting the Register and Register Forks
3. Setting the Stock Table
4. Setting the Feeding Mechanism
5. Setting the Delivery Mechanism
6. Setting the Vacuum System

GROUP EIGHT

CYLINDER PRESS

UNIT I. CYLINDER PRESS FEEDING
1. Getting Acquainted with the Press
2. Oiling and Cleaning
3. Feeding Blank Stock
4. Feeding Live Jobs
5. Washing Up

UNIT II. PRESS PREPARATION

1. Preparing the Tympan
2. Inking the Press
3. Setting the Guides

UNIT III. MAKE-READY

1. Placing the Form
2. Underlaying
3. Overlaying
4. Registering and Position O. K.
5. Type Forms
6. Wood-Base Electros
7. Mixed Forms

UNIT IV. MINOR ADJUSTMENTS

1. Sheet Control
2. Gripper Motion
3. Sheet Delivery
4. Fountain

UNIT V. MAKE-READY FOR ENGRAVINGS

1. Line Plate and Ben Day
2. Square Half-Tones
3. Color Type-Forms
4. Vignette
5. Duotone
6. Process Color

UNIT VI. PRESS ROLLERS

1. Composition
2. Adjustment
3. Care and Seasoning
4. Ordering

UNIT VII. PRINTING INK

1. Qualities of Ink
2. Ink on Paper

UNIT VIII. PRESS MECHANISM

1. Bed Motion
2. Cylinder Adjustments
3. Air Cushions

UNIT IX. MECHANICAL OVERLAYS

1. Preparing Press to Make Overlay
2. Impression
3. Relieving High Lights
4. Final Processes

UNIT X. PLATES AND BASES

1. Laying and Clamping Book Plates
2. Clamping and Registering Color Plates
3. Interlaying
4. Uses of Plates and Bases

UNIT XI. THE DEXTER AUTOMATIC PILE FEEDER

1. Mechanical Details
2. Loading Stock
3. Adjusting Rear End
4. Adjusting Front End
5. Registering the Sheet
6. Starting the Machine
7. Reloading
8. Care of the Machine

UNIT XII. THE DEXTER AUTOMATIC CONTINUOUS FEEDER

1. Mechanical Details
2. Loading Stock
3. Adjusting Rear End
4. Adjusting Front End
5. Registering the Sheet
6. Starting up the Machine
7. Reloading
8. Care of the Machine

UNIT XIII. COLOR

1. Base Color Selection
2. Mixing and Matching
3. Color Modifications

UNIT XIV. TYPES AND USES OF CYLINDER PRESSES

1. Job Cylinders
2. Two-Revolution Cylinders
3. Drum Cylinders

GROUP NINE

LINOTYPE

UNIT I. KEYBOARD PRACTICE

1. Keyboard Layout
2. Keyboard Action
3. Word Practice
4. Sentence Practice
5. General Keyboard Practice

UNIT II. STRAIGHT MATTER COMPOSITION

1. Mechanical Details
2. Care of the Machine
3. Operation of Live Keyboard
4. Spacing and Justification
5. Setting Various Styles
6. Care of Metal

UNIT III. INTRICATE COMPOSITION

1. Twin Slug Composition
2. Broken Measure
3. Borders and Dashes
4. Advertising
5. Price-Lists
6. Sports and Markets
7. Statistical and Classified
8. Two-Line Figures
9. Panel
10. Newspaper Headings
11. Programs and Poetry
12. Folios and Book Headings
13. Directory and Mailing List
14. Signs and Symbols

UNIT IV. MECHANISM

1. Keyboard Construction
2. Magazine Escapement
3. Magazine
4. Distributor
5. Distributor Box
6. Assembler Plate
7. Assembling Elevator
8. Assembler Slide
9. Space Band Box
10. Dissembling
11. Driving Shaft and Clutch
12. Automatic Stopping Pawls
13. Controlling Lever
14. Automatic and Safety Pawls
15. Cams
16. Mold Disk
17. Justification
18. Vice Automatic
19. First Elevator
20. Line Carriage
21. The Transfer
22. Second Elevator
23. Trimming Knives

24. Metal Pot
25. Gas Burner
26. Temperature Governor
27. Pressure Governor

GROUP TEN

MONOTYPE

Unit I. Casting Machine Mechanism

1. Control and Regulation
2. Cleaning Air Pins in C Pin Block
3. Inserting New B Stop Rack

Unit II. Casting Machine Dismantling, Assembling, and Adjusting

1. Complete Dismantling
2. Assembling
3. Adjusting Locking Bars
4. Adjusting Paper Tower
5. Adjusting Jaw-Tongs Spring Box
6. Adjusting Type Carrier
7. Adjusting Type Pusher
8. Adjusting Transfer-Wedge Spring Box
9. Adjusting Transfer-Wedge Shifting Lever
10. Adjusting Justification-Wedge Lever-Arm Rods
11. Adjusting Bell Cranks
12. Adjusting Normal-Wedge Locking Pin
13. Adjusting the Galley
14. Adjusting Mold-Blade Operating Rods
15. Adjusting Carrying Frame and Draw Rods
16. Adjusting Low Quad
17. Adjusting Pump
18. Adjusting Space-Transfer Wedges

Unit III. Casting Machine Operating

1. Changing Over
2. Casting Body Type
3. Learning Matrix Symbols
4. Monotype Mathematics
5. Casting Display Type and Spaces
6. Casting Leads, Rules, and Borders
7. Care of Metal
8. Trouble Finding

UNIT IV. CLEANING AND CARING FOR MOLDS

1. Style 1E Composition Mold
2. Style 2E Non-Adjustable Mold
3. Styles T and U Sorts Casting Molds
4. Styles 1R, 1RA, and 1RB Molds
5. Styles Y and Z Molds

UNIT V. TYPE AND RULE CASTER

1. Control and Regulation
2. Oiling the Machine
3. Adjusting the Machine
4. Changing Molds
5. Casting Body Type and Spaces
6. Casting Display Type and Spaces
7. Casting Leads and Rules
8. Care of Metal

UNIT VI. AIR COMPRESSOR

1. Oiling and Cleaning
2. Air-Pressure Governor
3. Valve Disks
4. Condensing Tank

UNIT VII. NON-DISTRIBUTION SYSTEM

1. Plan of the System
2. Stocking the Cabinets
3. Distribution Analysis
4. Operation of the System

UNIT VIII. KEYBOARD OPERATING ON STRAIGHT MATTER

1. Position at the Keyboard
2. Letter Combinations
3. Practice Words
4. Alphabetical Sentences and Capitals
5. Ligatures
6. Use of Unit Wheel and Fixed Spaces
7. Use of Justifying Scale and Justifying Keys on Reprint Copy
8. Setting from Corrected Typewritten Copy
9. Inaccurate Copy
10. Correct Copy Set to Changed Measures
11. Inaccurate Manuscript Copy
12. Reset Marked Proof
13. Inaccurate Copy with Involved Styles
14. Allowance for Initials and Cuts
15. Changing Ems and Units from One Set to Another
16. Letter Spacing
17. Date Lines and Signatures
18. Hanging Indentions and Leaders

19. Typewriter and Mailing List Faces
20. Newspaper Double Matrix Figures
21. Using Duplex Keyboard

UNIT IX. KEYBOARD OPERATING ON TABULAR MATTER

1. Use of Unit Wheel for Column and Leader Work
2. Directory and Tariff Work
3. Tabular Work with Rules
4. Catalog and Ditto Work
5. Multiple Column Work
6. Intricate Tabular Composition
7. Box Headings

UNIT X. KEYBOARD MECHANISM

1. Dismantling
2. Assembling

UNIT XI. KEYBOARD ADJUSTMENTS

1. Justifying Space Cut-Out
2. Unit Wheel Mechanism
3. Em Rack and Scale
4. Bell
5. Tension Piston Rod
6. Unit Rack Stop Guide
7. Paper Feed
8. Justification Scale Mechanism
9. Double Keyboard Switch Control
10. Removing Punches
11. Oiling Keyboard
12. Trouble Finding

UNIT XII. COPY FITTING

1. Set-Ems System of Measuring
2. Changing Typewriting into Set-Ems
3. Fitting Copy Without Cuts
4. Allowance for Cuts
5. Use of Copy Fitting in Estimating

GROUP ELEVEN

AMERICAN SOCIAL AND INDUSTRIAL HISTORY

Unit I. Human and Industrial Relations

1. Value of Education
2. Importance of the Printing Industry
3. The Family Groups
4. Social Groups
5. Human Relationships
6. Use of Records
7. Production and Exchange
8. Industrial Organization

Unit II. Making of the United States

1. The Beginning of Modern Life
2. The Development of Typography
3. Discovery and Colonization
4. Reasons for Settlement
5. The Struggle for Independence
6. The Father of His Country
7. A Statesman-Printer

Unit III. Development of the United States

1. American Ideals
2. American Institutions
3. Winning the Continent
4. Expansion and Consolidation
5. Industrial Development
6. Social Development

Unit IV. Economics of the Printing Industry

1. Organization
2. Materials and Necessities
3. Administration
4. Production
5. Conservation

GROUP TWELVE

ENGLISH FOR PRINTERS

UNIT I. THE DICTIONARY

1. Value of English to the Printer
2. The Alphabet
3. How to Use the Dictionary
4. Story of Words
5. Spelling
6. Prefixes and Suffixes
7. Division of Words
8. Compound Words
9. Derivation of Words

UNIT II. CAPITALS AND PRINTERS' MARKS

1. Punctuation
2. The Comma
3. Hyhenation
4. Capitalization
5. Abbreviations
6. Reference Marks and Symbols
7. Signs

UNIT III. FUNDAMENTALS OF ENGLISH GRAMMAR

1. Parts of Speech
2. The Noun
3. The Pronoun, Adjective, and Adverb
4. The Verb
5. Analysis of Sentences

UNIT IV. ENGLISH COMPOSITION AND LETTER WRITING

1. Construction of Sentences
2. Clearness and Force
3. Purity and Propriety
4. Unity
5. Business Letters
6. Business Forms

UNIT V. COPY PREPARATION AND PROOF-READING

1. Copy Materials
2. Style
3. Editing
4. Necessity of Proof-Reading
5. The Marks
6. Copy-Holding
7. Reading Proof

GROUP THIRTEEN

ARITHMETIC FOR PRINTERS

UNIT I. NUMBERS AND UNITS

1. The Story of Numbers
2. How Numbers are Expressed
3. Whole Numbers
4. Common Fractions
5. Decimal Fractions

UNIT II. FUNDAMENTAL OPERATIONS

1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Arithmetical Signs and Symbols
6. Averages

UNIT III. COMMON FRACTIONS AND DECIMALS

1. Exact Divisors and Factors
2. Use of Common and Decimal Fractions
3. Combinations
4. Operations
5. Interpreting Values

UNIT IV. RATIO AND PROPORTION

1. Use of Terms
2. Levers
3. Pulleys and Screws
4. Cams and Eccentrics
5. Verniers and Micrometers
6. Transmission of Power

UNIT V. PERCENTAGE

1. Development of Percentage
2. Simple Discount
3. Trade Discounts
4. Interest
5. Thrift
6. One Hundred Percent

UNIT VI. APPLICATIONS TO THE INDUSTRY

1. Composing Room
2. Paper and Ink
3. Pressroom
4. Bindery
5. Photo-Engraving and Electrotyping

GROUP FOURTEEN

DESIGN FOR PRINTERS

UNIT I. PRINCIPLES OF ARRANGEMENT

1. Purpose of Design
2. Materials of Design
3. Surface
4. Harmony
5. Proportion
6. Balance
7. Rhythm
8. Symmetry and Variety
9. Motion

UNIT II. DERIVATION OF ORNAMENT

1. Anatomy of Ornament
2. Symbolism
3. Esthetics
4. Ornament in Nature
5. Inventive Ornament
6. Geometric Design

UNIT III. TYPOGRAPHIC DESIGN

1. Typography and the Fine Arts
2. Appropriateness
3. Materials of Typographic Design
4. Paper in Design
5. Texture in Ink
6. Type Design
7. Legibility
8. Type Contrast
9. Type Simplicity
10. Decoration
11. Illustration
12. Binding

UNIT IV. BOOK DESIGN

1. Story of the Book
2. Unity
3. The Parts of the Book
4. Planning a Book
5. Size—Fitness to Purpose
6. Material—Text and Illustrations
7. Type
8. How the Book May be Decorated
9. Margins
10. Page Treatment
11. Presentation

UNIT V. DESIGN IN COMMERCIAL PRINTING

1. Business Books
2. The Catalog as a Book
3. The Pamphlet Catalog
4. Pamphlets
5. Folders
6. Circulars
7. Leaflets

UNIT VI. TYPOGRAPHIC DESIGN IN ADVERTISING

1. An Advertisement as a Unit
2. Essentials of an Advertisement
3. Influence of Book Design
4. Departure from Book Design
5. Type in Advertising
6. Decoration in Advertising
7. Illustration in Advertising
8. Advertising Symbols
9. Limitation of Media
10. Publication Design

UNIT VII. TYPE AND PERIOD STYLE

1. Influence of Hand Lettering
2. Derivation of Type
3. Trade Terms for Type
4. Type Widths
5. Type Weights
6. Type Families
7. Period Style
8. Mongrel Types

UNIT VIII. COLOR IN TYPOGRAPHIC DESIGN

1. Uses of Color
2. Color Analysis
3. Values
4. Harmony of Color
5. Judging Color
6. Simple Color Combinations

UNIT IX. PROCESSES OF REPRODUCTION

1. Photographic Principles
2. The Three Surfaces (Relief, Planographic, Intaglio)
3. Relief Surfaces
4. Plane Surfaces
5. Intaglio

GROUP FIFTEEN
PAMPHLET BINDING

UNIT I. FOLDING
1. Hand Folding
2. Machine Folding
3. Types and Uses of Folders

UNIT II. STITCHING AND TRIMMING
1. Gathering
2. Wire Stitching
3. Sewing
4. Attaching Covers
5. Trimming

UNIT III. FINISHING OPERATIONS
1. Punching
2. Perforating
3. Padding
4. Inspecting

UNIT IV. FOLDING MACHINES
1. Oiling and Cleaning
2. Machine Changes
3. Guides
4. Right Angle and Oblong Folds
5. Parallel Folds
6. Scoring and Perforating
7. Slitting and Delivering
8. Special Folds

UNIT V. CUTTING MACHINES
1. Oiling and Cleaning
2. Gages and Clamp
3. Knife Control and Adjustment

UNIT VI. WIRE STITCHERS
1. Oiling and Cleaning
2. Setting
3. Stitcher Mechanism

GROUP SIXTEEN

SHOP ROUTINE FOR PRINTERS

UNIT I. TIME RECORDS

1. Time Tickets
2. Principles of Time-keeping

UNIT II. SPECIFICATIONS AND INSTRUCTIONS

1. Job Tickets
2. General Orders

UNIT III. DEPARTMENT RECORDS

1. Material Records
2. Requisitions
3. Production Records
4. Reports

UNIT IV. CO-OPERATION

1. The Policy of the House
2. Departmental Co-Operation
3. Local and International Employers' and Employees' Organizations
4. Apprentice Opportunties

GROUP SEVENTEEN

POWER EQUIPMENT FOR PRINTERS

UNIT I. MOTORS

1. Oiling and Cleaning
2. Brushes and Armatures
3. Fuses and Connections
4. Starters and Controllers
5. Alternating and Direct Current Motors

UNIT II. BELTS AND PULLEYS

1. Selection and Care of Belts
2. Belt Repairs
3. Use of Pulleys

GROUP EIGHTEEN

HEALTH AND SAFETY FOR PRINTERS

UNIT I. HEALTH FACTORS

1. Ventilation
2. Sanitation
3. Lighting
4. Recreation
5. Diet
6. Personal Habits

UNIT II. ACCIDENT PREVENTION

1. Mechanical Safeguards
2. Fire Hazards
3. Safety Precautions
4. Personal Responsibility
5. First Aid
6. Accident Compensation

GROUP NINETEEN

PROOF-READING

UNIT I. THE PROOF MARKS

1. Learning the Proof Marks
2. Using the Caret
3. Spacing the Text
4. Correcting Alignment
5. How to Delete
6. Spacing the Lines, Correcting Transpositions
7. Correcting Defective Type and Wrong Fonts
8. Correcting Wrong Paragraphing
9. Miscellaneous Corrections
10. Revision

UNIT II. COPY-HOLDING

1. Learning the Copy-Holder's Jargon
2. How to Read

UNIT III. OFFICE ORGANIZATION

1. Jobbing Office Organization
2. Book and Magazine Office Organization
3. General Proof Room Record Keeping
4. Commercial Proof Room Record Keeping, 1
5. Commercial Proof Room Record Keeping, 2
6. Newspaper and Periodical Proof Room Record Keeping

UNIT IV. PROOF ROOM PROCEDURE

1. Galley Reading and Revising
2. Handling Author's Proofs and Page Proofs
3. Correcting Display Matter
4. Final Reading
5. Reading the Text
6. Looking for Libel
7. Exercising Public Criticism, Critic's License, etc.
8. Learning Technical Terms

UNIT V. SPECIAL DEPARTMENTS

1. Book Work—Make-Up
2. Book Work—Page Space and Copy
3. Correcting Straight Dialogue
4. Correcting Difficult Dialogue
5. Correcting Dialect
6. Editorial Proof-Reading
7. Correcting Commercial Jobs

UNIT VI. CORRECTING TABULAR MATTER

1. Correcting Simple Tables
2. Correcting Headings and Justifying
3. Types, Leads, and Rules
4. Problems